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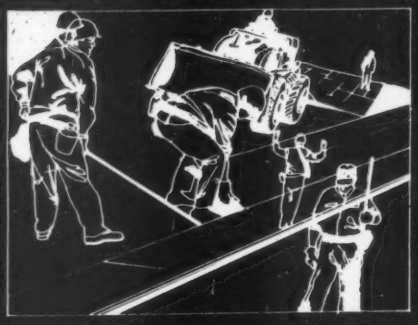
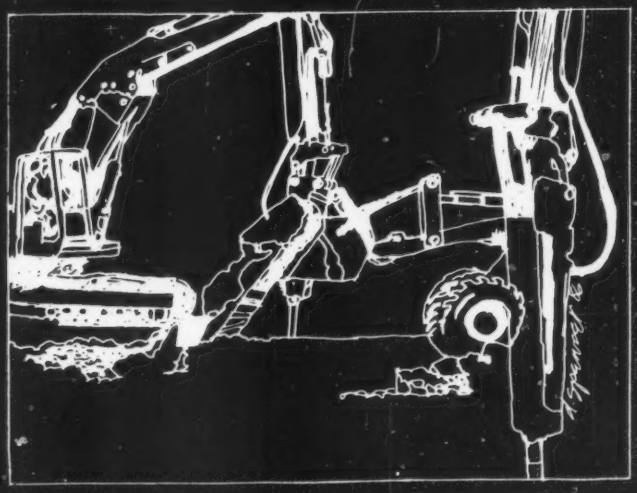
Air Force Engineering & Services Quarterly

READINESS CHALLENGE '86





From the Director

CHANGE OF COMMAND — General Ellis, Colonel Gilbert and Colonel Kennington at the change of command.

Last month, the command changed at Headquarters, Air Force Engineering and Services Center. It's important for us to have the right person in command at the Center. It is demanding job. Only a commander understands the tremendous responsibilities for people and resources that go along with becoming a commander. The challenges are significant, the rewards commensurate.

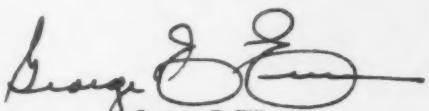
Col. Bob Gilbert led the Center very well. He can be proud of many achievements. He supported research and development, and opened new doors, including testing for NATO. There were new initiatives in housing and billeting which will benefit the Air Force for years to come. And, the hospitality industry in the near future will help us recognize excellence in billeting in the same way that we do in food service with the Hennessy trophy. We faced some terrible challenges in a little-known area of our mission, mortuary affairs, and earned the respect and admiration of our leadership throughout the Department of Defense. Our operations and maintenance initiatives have been outstanding — new equipment, vehicles, manpower and training ideas; a new image. There have been new energy initiatives which will improve sustainability in emergency and wartime conditions; and new ways to make our energy dollars go farther. Support for our computer operations has moved forward with our most complete suite of new equipment yet. We have bridged the gap, I believe, between R&D and acquisition. Soon, we'll be fielding new rapid runway repair equipment. Our fire protection community bridged that gap a long time ago, and they continue to move out smartly. Most important of all, we're reorganizing to train the way that we will have to fight, a key achievement in readiness.

Each of these programs has a leader — a director. It was Colonel Gilbert's responsibility to lead, to act as a facilitator, and to make it all happen. He did. It's time for Colonel Gilbert to move on and do some different things, face some different, and in some ways, bigger challenges as the deputy chief of staff, Engineering and Services, at HQ Air Force Systems Command.

I've been watching Col. Roy Kennington for years. He just keeps getting better with age — like a good wine. We're going to give him a chance to lead the Center team. He is our first commander from the Services side of the family. Since Engineering and Services were merged into a single family, there have been many firsts; and there will be many more in the future. What is important is that we have full integration of our management resources to achieve, in the coming months and years, objectives that are important to us. These objectives are:

- Reorganizing our readiness resources so that we organize and train the way that we fight;
- Decentralizing command, responsibility and authority;
- Modernizing and expanding our information management systems to make them productive throughout Engineering and Services; and
- Listening to our customers, and making it easier for them to complain, to say what they like and dislike about us.

Between my office in the Pentagon, and the people working for Colonel Kennington, we create policies and programs that satisfy these objectives. The task of making our business meaningful to a base or wing commander is always up to the base-level teams. What we do in the coming months, at my level in Washington, or at the Center, will focus on giving the base-level Engineering and Services teams the tools they need to achieve a quality fighting force, organized and trained to win, equipped to be productive under the most severe conditions. Our readiness forces will be properly assigned to an operational team where they will know their leadership, their mission, and know how to do their jobs.



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- Attract highly qualified personnel to the Air Force Civil Engineering and Services career fields.
- Promote effective training, education, and retention.
- Communicate vital concepts, policies, and practices which affect the wartime readiness of the United States Air Force.
- Promote professionalism and devotion to duty.
- Stimulate planning for the wartime survival of our personnel, weapons systems, and facilities.
- Develop Air Force stewardship of the well-being, quality of life, and facilities support to Air Force personnel and their families throughout the world.
- Promote awareness of the efficient, effective, and essential facilities needs of the Air Force.
- Transfer knowledge of Air Force Engineering and Services technical and scientific achievements.
- Promulgate teamwork among the Air Force Engineering and Services' total force.
- Achieve a professional dialogue to enhance the thought, development, and contributions of the Engineering and Services team worldwide.

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CALL OR WRITE: The Editor, HQ AFESC/DEJ, Tyndall AFB, FL 32403-6001, AUTOVON 970-6467

Figure 1

Figure 2

by Col. Harry Glaze

Readiness has a definite, task-oriented meaning. It means being able to put aircraft in the air from the stationary fighting platforms we call bases, into a potential theater of conflict; it means having trained people and adequate equipment to provide the necessary facilities to launch and recover aircraft from our bases in time of war.

We've taken positive action toward getting our Engineering and Services personnel trained to do the job we're expected to do — support air power in war. But there are negative signals that concern me. I feel that we, in the Engineering and Services community, are not as ready to support air power in war as we should be. Like all ars we've fought in recent history, we'll have to scramble to provide the kind of support our commanders will demand and deserve.

The following quote by Admiral Sir Herbert Richmond of the British Royal Navy in 1938 is the basis of this article: *"The peacetime routine had corroded the military mind so that it lacked stimulation to think of war. Well-intentioned questions and suggestions, if adopted, would make work and upset the pleasant and well-oriented routine."*

I call this inherent resistance to change the "keep-off-the-grass" syndrome. (See Fig 1.) It would make no sense at all to stay off the grass, but we're doing that every day. When we refuse or resist changing that mindset, the grass will grow higher, out of control, around our shiny shoes.

It hasn't been all bad. The Engineering and Services community has done well in past wars and we'll likely do the same in the next one. We have a proud history of significant achievements in several past wars. In World War II, three very important engineering events demonstrated our capability to support air power.

First, in Biskra, Algeria, in 1942, airborne aviation engineers deployed in 56 C-47's deep in the Sahara Desert and built a B-17 runway ready for flying operations in 24 hours.

At Tsili Tsili, New Guinea, in 1943, airborne engineers built a runway and hardstands in 10 days behind enemy lines, without being detected. They also had the natives build fake airstrips nearby to attract enemy attention to the wrong target.

In 1944 near Shingbwiyang, Burma, an aviation engineer battalion built five runways in 5 days, deep in enemy territory.

All of these were phenomenal achievements under any conditions!

By the Korean War, aviation engineers had a much heavier construction capability and built the Osan AB runway in less than 5 months.

Our record in the Vietnam conflict is legendary. The Prime BEEF program was generated primarily to put up the miles of revetments throughout that theater of operations. (See Fig 2.) And the RED HORSE support for the Theater Air Base Vulnerability (TAB VEE) program with construction of a concrete shelter every 7 days has never been equalled.

There's no question we have a proud history. But we made mistakes and lessons are to be learned from each of those experiences. We cannot afford to make the same mistakes time and time again. But are we, in fact, learning? Here are some quotations that suggest we are not:

Italy, 1944: *Steel plank runways disintegrated rapidly under use. It was a nightmare of buckled runways, frenzied repairs, mud, water and neglect of other construction.*

Taegu AB, Korea, 1951: *Steel plank runways were never satisfactory because they were laid on unstable ground and pounded by 10,000 take-offs and landings per month. They finally went to pieces. The collapse of this runway threatened to take three fighter/bomber groups out of action.*

Phan Rang AB, Vietnam, 1966: *Failures began to spread across the ramp with cancer-like rapidity. In over a week, the ramp had suffered 90 percent failure. The result of this condition costs us many, many dollars and tremendous manpower.*

History does, in fact, teach lessons. But we are not learning from our history unless we act on the knowledge it provides!

Just where have we come in Air Force Engineering over the past 20 years? I've tried to analyze the thrust of our efforts by placing our past 20-year history into four performance-oriented phases:

- **Vietnam Era:** Between 1965 and

1972, our engineering forces supported Vietnam. The engineers were not prepared for war. We drained CONUS resources and "borrowed" from Europe to sustain our efforts. In the operational theatre; we lost control of billions of dollars in equipment and materials. We invested thousands of mandays training people for wartime roles they didn't know and had never practiced or had never been exposed to.

• **Customer Service Era:** During the period between 1973 and 1978, we focused our attention on management and getting our internal house in order. The war had put the customer as the last priority and our ability to provide service was definitely hampered. More important, we lost credibility. Some readers may remember Maj. Gen. Bob Thompson's global efforts to "resell" the Engineering and Services mission. His success allowed us to reclaim lost ground and got some momentum going once again.

• **Quality-Of-Life Era:** During the years between 1979 and 1984, after getting our in-house act together and convincing commanders (at all levels) that we could get the job done, we took on one of the biggest programming and engineering challenges ever faced. We nearly rebuilt our infrastructure from the ground up by bringing on line billions of dollars in new and modernized facilities to support the entire Air Force family. The Air Force quality of life pays immeasurable dividends in positive retention, morale, and recruiting efforts which all equate to increasing our readiness posture. We're not finished with this program and probably never will be, but the emphasis is changing. We are shifting our priorities to prepare ourselves for the next war. And it's not only in engineering but across the entire Air Force.

• **Readiness Renaissance:** We are now beginning to concentrate more of our resources toward wartime missions and preparation for what we've been asked to do: build air bases and keep planes flying. We may be able to change that "keep-off-the-grass" mind-set after all.

This renaissance started in 1985. At the Worldwide Engineering and Services conference in 1984, 45 minutes were devoted to readiness issues. During 1985, several MAJCOM conference themes focused on readiness; as did the 1985 Worldwide which devoted half of the 3-day conference to this important issue. Secondly, Maj. Gen. Clifton D. (Duke) Wright, then director, Engineering and Services, HQ USAF, created a Tiger Team in 1985 to "free-think" force sizing and total wartime requirements. The SALTY DEMO exercise conducted at Spangdahlem AB, Germany, in May, 1985, tested the engineers' ability to perform rapid runway repair in hostile, chemical environments. (See Fig 3.) The results of SALTY DEMO, which are currently being briefed to the Air Staff and MAJCOM CINC's, will drive and refine readiness requirements for years to come. Finally, perhaps the most significant indication that we've started stepping on the grass was reflected in General Wright's E&S Strategic Plan, which pushed readiness and sustainability to the top of our priority list, moving up from Goals 4 and 5 in just one year.

Could we have started this "readiness renaissance" 10 years ago? Probably not, because we and the system weren't ready for it. The Vietnam, customer-service and quality-of-life eras were important in and of themselves. We had to get our house in order and fix up those fighting platforms, our airbases, that were falling down around us. We did what had to be done. But, we need to focus now on the tasks engineers must accomplish during a war.

Now, I'll show you what this "keep-off-the-grass" mentality has done to us in the Pacific theater and elsewhere in our Engineering and Services community.

Col. Harry W. Glaze retired as deputy chief of staff, Engineering & Services, HQ Pacific Air Forces, Hickam AFB, Hawaii. Before, he was commander, 554th Civil Engineering Sq., Heavy Repair (RED HORSE), Osan AB, Korea. Earlier, he managed Saudi facilities construction in support of F-5 and F-15 aircraft. He graduated from the University of Arkansas with a bachelor of science degree in Civil Engineering; the Industrial College of the Armed Forces; and the Air War College. After starting as an Army combat engineer, his Air Force career began in 1962 at Scott AFB, Ill. At Phu Cat AB, Vietnam, he was chief of engineering, 819th RED HORSE Sq. A registered professional engineer in Alabama, he is active in both the Society of American Military Engineers and the National Society of Professional Engineers.

Figure 3

Perhaps the most significant hinderance to PACAF progress in the readiness arena during the 12 post-Vietnam years, has been our preoccupation with Korea. This narrow view has restricted our orientations toward force sizing, training, exercise planning, survivability criteria, and pre-positioning of War Readiness Material (WRM) assets.

In the "keep-off-the-grass" mind set we were anticipating a Vietnam-type conflict *a la* Korea, and gearing up for that kind of scenario, to the exclusion of all else. Even the increasing threats in the region did not cause us to change our direction.

In 1984, General O'Malley, then CINCPACAF, refocused the staff's attention toward a much broader-based theater of conflict because of the strategic importance of the Pacific. The Pacific region provides significant amounts of the world's most important raw materials. Commodities, such as those widely used in aircraft production, are vitally important to our national interests. (See Fig 4.) The Arabian Gulf Oil flows through the Indian Ocean and the Pacific en route to allied Asian countries and North America. (See Fig 5.) Finally, United States trade with the Pacific community exceeds that of any other geographic area of the world, including our traditional trading partners in Western Europe. (See Fig 6.)

Because of the increasing Soviet

threat, our planning thrusts need to continue to focus on potential theater-wide conflicts rather than just Korea. This redirection has required us to open dialogue with all our allies in the Pacific, shifting our emphasis from one-country involvement to the entire theater. Obviously, we have had to revisit our plans in depth and make vast revisions.

Unit Deployment Planning

Another basic problem is that unit deployments to PACAF locations other than Korea have been given little attention. As a result, support units deploying from the CONUS are often separated from their parent wings and squadrons. As we revisited time-phased deployment documents, we found a CONUS-based RED HORSE unit tasked to be in-place and operational within 30 days and, in too many instances, we found firefighters disconnected from parent units and the aircraft they train to support.

The "keep-off-the-grass" mentality ties the Engineering and Services mission to facilities and people, not airplanes. In this mind set, we also believe units like RED HORSE squadrons are ready to deploy worldwide, that airlift is available to get them to the deployed location in 30 days, and that they are trained and prepared for any and all assigned tasks. Some even feel that unit integrity is unimportant, looking at functions in isolation, and disassociating them from their wing mission. There are also those who believe our fire fighters are trained to do crash rescue and crew extraction on all airframes, or that a small nucleus of firefighters will train the rest.

We can break away from this debilitating syndrome if we make a few basic changes. First, we must review the time-phased force deployment list and attempt to keep operational and essential support units together. This will execute the unit integrity concept, and ease airlift taskings. The commander will arrive at the scene with forces tailored to his specific needs. Second, we must continue to marry Engineering & Services support to operational requirements and tailor our capabilities to support the flying mission. Third, we must communicate airlift and sealift requirements so that everyone has a realistic understanding of the level of support our teams can provide upon arrival. Cooks without kitchens, engineers without tools, and firemen without vehicles certainly have limited capabilities. One way to expand our support capabilities is to get a clearer picture of what our sister services are doing to meet similar needs.

Figure 5: Arabian Gulf oil flow

Figure 4: Pacific commodity interests

Army Support Planning

There is no question that the Army plays an important role in our airbase recovery (ABR) mission. In PACAF we depend heavily upon the Army in Korea, yet we've done little to nurture that relationship. We have only scratched the surface in the joint planning arena, and those few training and exercises that have been done were sorely lacking. How could this happen with the unified command structures under which we operate? Part of it has been caused by our Korea-only mentality.

However, service rivalries are probably the biggest hurdle. To suggest we need the Army is to admit that the Air Force is not self-sufficient. Army engineer units have

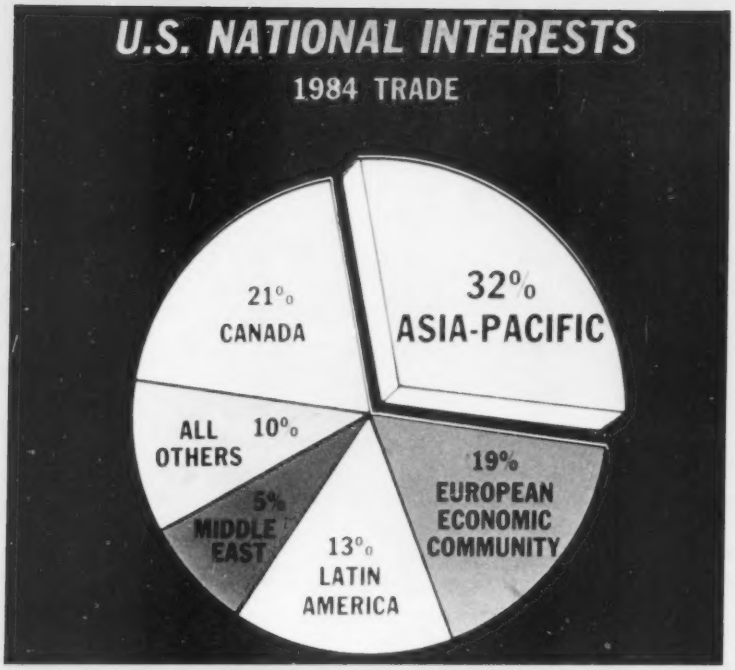

Figure 6: Pacific trade statistics

never been manned or equipped to do the job for the pilot and satisfy the ground troop commander's needs, as well. Aviation Engineers in World War II, Special Category Army with the Air Force (SCARWAF) in Korea, and RED HORSE in Vietnam were created to satisfy unique Air Force needs. Historically, the Army chain of command has directed the limited, available Army engineer force to the forward edge of the battle area. So wing commanders and base civil engineers put little confidence in agreements that theoretically include Air Force requirements.

To reverse this troublesome trend, we must redefine theater roles and missions. The entire spectrum of threat-and-response scenarios must be compared with the available engineering resources to allocate those assets properly and identify shortfalls. We also need to establish thresholds and standards so that interdependent services are operating from the "same sheet of music." Questions such as timeliness of support, length of joint support, and work standards must be addressed and answered. And, finally, we need to coordinate our plans in the joint arena, getting all the players on board. Furthermore, we must execute the plans by joint training and exercises to evaluate their effectiveness. Unfortunately, we have similar communication and coordination problems with our host nations.

Host Nation Planning

Our war-planning efforts have been diminished by our inability to include host nations in many operational and base support plans. That we expect cooperation without allowing them access to the rules of engagement or the schedule of events is mind-boggling! Likewise, our hosts are not always forthright with us when it comes to disclosing their war plans. The United States may not be in place when the war starts. Korea recalls the uncertainty of the Carter years. None of the services in the Pacific theater really know what our allies' engineering capabilities are. And certainly, we have not agreed on criteria or performance standards.

How did we get this way? Many of our operational planners want to avoid commitment to any particular country and have built their plans accordingly. Operational planners will argue this is a way to maintain air power-flexibility. But is it the best position to operate from? Another factor contributing is the inherent (typically American) belief that we can fight alone. Our hosts have often not achieved the same level of sophistication and competence and to plan with them may be more complicated than it's worth. (Of course, parochialism creeps in with the threat of Engineering & Services manpower cuts if the host demonstrates a capability to fight our fires, cook our meals, and repair our airbases.) Finally, we assume host engineering forces are fully trained and equipped. That way, we don't have to deal with plans, training, criteria, and working together. More often, we just ignore these areas.

But, we can overcome these attitudes by following some relatively simple recommendations. We must

Figure 7: Joint training at Suwon will help ease planning and coordination problems with the host nation

encourage *formal* host support agreements. This may involve declassifying certain documents and dusting off old status of forces agreements. But, at the very least, we must have full disclosure from both sides. We must initiate joint planning teams to survey all the bases. Although this may strain already limited resources, it's a wise investment which will result in a realistic tally of requirements and capabilities. We must support and fund joint training exercises, training as we intend to fight. PACAF has initiated such joint training at Suwon which addresses tough problems like command and control, interoperability of equipment items, definition of responsibilities and clarification of capabilities. (See Fig 7.) We need to quantify requirements in our war plans. Instead of addressing broad generalities, we must size the forces to meet the specific needs of the deployed unit. We're probably years away from making significant progress in this area, but we're moving in the right direction. Another contingency area that has changed substantially and is taking on new direction is the RED HORSE mission. However, the "new direction" might be going the wrong way.

Red Horse Capability

The RED HORSE mobility mission has deteriorated to such a point that I now have serious doubts we could deploy to a new theater of operations without considerable lost time and head scratching. We've become a stationary contractor. A contributing factor here is that our young engineers are not designing projects, and our NCOs and airmen are only challenged to solve conventional problems. They manage projects and rely on outside agencies and sources for designs and drawings. We've tended to isolate training from their daily tasks when their "real" job, everyday, should be training. The reality is that projects come first — training is squeezed in when there's time. And, we've found our HORSE unit has a very limited logistics capability. Acquisition of materials is no longer an integral unit capability. This certainly impacts RED HORSE's capability since we don't start the job until all materials are available.

RED HORSE is in its current state of limited capability for many reasons. The squadrons were created to perform a contingency mission during a war and we have been trying to protect this vital capability from auditors and manpower cutters. Conversely, we have allowed the IG to evaluate RED HORSE in a peacetime scenario. Current unit type codes (UTCs) have been developed, using specific manpower, equipment and materials for wrong reasons, such as easing airlift planning requirements, and tailoring to (peacetime) inspection criteria. We have, in fact, simplified airlift planning but have not encouraged realistic, rational thinking to develop the best possible employment of airlift — we've settled into the easy solution.

The RED HORSE officer cadre was tailored to provide a multidisciplined engineering and support capability. This capability has deteriorated by

Figure 8: We must build confidence into our officer and NCO corps

Figure 9: Our contingency engineering course is voluntary

Figure 10: Perfectly aligned tent city

allowing other organizations and functions to design projects. We're caught in that mindset that encourages cookbook, conventional designs for routine projects. the enlisted force relies on the standard OJT program, designed for base engineering operations and maintenance tasks, to drive the vastly different contingency engineering RED HORSE training program. We assume their project program will satisfy the contingency portion of enlisted/officer training needs.

We recognize these and many other shortfalls in our PACAF squadrons and have been trying to get things back on track. We must revisit the RED HORSE mission statement to determine where our focus should be.

It's apparent where we need to concentrate because that's how we're going to fight. After all, remembering our history lessons, that's exactly how the first squadron was used.

RED HORSE MISSION:

- **Heavy Damage Repair**
- **Engineering Support for Beddown**
- **Mobility**
- **Self-Sufficiency**
- **Hostile Environment**

We recognize limits to airlifting RED HORSE. In an effort to be as realistic as possible, we are changing the time-phased deployment listings. We're also attempting to use and coordinate airlift/sealift capabilities for many of our intra theater projects which will help us scrub down some of these logistic capabilities.

We must give our lieutenants and engineering assistants some real-world design challenges by stressing contingency engineering. They must learn how to design from available materials, equipment and skills rather than designing from conventional engineering practices and building codes. We must challenge these outstanding officers and enlisted personnel to lead, make decisions, think and take the heat. (See Fig 8.) This is sure to build confidence in our young officer and NCO corps. They've shown they can do the job, and do it well, if we allow them to learn by doing, to make mistakes and even to fail. Another contingency facet we rely heavily upon, which has given us ample opportunity to fail, is the Harvest Eagle kit.

Harvest Eagle Planning

Harvest Eagle was designed to do all things for all theaters. Military peculiar items are very hard to find replacement parts for and are often nothing like the operator has been trained to use in his daily routine at Base X. The Eagle only has end items, so there are no spares.

The Eagle kits are a product of what our Engineering and Services community specified. We built a requirement because we wanted our equipment to work anywhere, anytime. Spares are not included with the kits because suppliers and users believe nothing will break down within the first 30 days. We have assumed supply pipelines will be open within 30 days and equipment operators will be trained and proficient on all the equipment — quite a few assumptions without supporting hard data.

We can break out of this restrictive mode, starting with a careful review of the criteria. We need to challenge the initial requirement that generated the item. We may find that much equipment which is military unique and outdated could be replaced with an off-the-shelf model available in the commercial market-place. The Air Force, in general, and PACAF, specifically, must continue to surface Harvest Eagle shortfalls at annual logistics reviews. As for spares, PACAF will continue to cover our Eagle shortfalls by building wartime active support packages. But, the equipment will not win the war for us. Our people are the key to success in future conflicts and they represent an area that causes me considerable concern.

Officer And NCO Training

I believe one of the most serious shortfalls in our work force is in contingency engineering orientation. Because over 75 percent of our officers were commissioned since 1972, few of our people have Vietnam experience. Our professional Air Force military engineering curriculum devotes just one course to contingency engineering and it's *voluntary*. (See Fig 9.) The opportunities available to a standard base civil engineering organization do not have sufficient leadership challenges.

We find ourselves in this position partly because of our emphasis on peacetime management. Also, the firm holds the civil service community has on key positions is tough to overcome, *if* we even want to. Our engineering practices are maintenance-oriented, therefore, our training is focused in that direction. Readiness training to prepare for contingencies is expensive in terms of manpower, equipment resources and materials but, even more important, it decreases the base civil engineer's productivity.

The prescription for change is to increase contingency engineering training. How? We need to start at our formal schools by allocating additional resources to Wright-Patterson, Sheppard and Lowry AFBs. We must also strengthen military involvement in our peacetime organization to build confidence and develop decision-making skills within the junior officer/NCO corps. And we've got to accept the fact that we will lose some productivity as we push this heavy training investment. We can help our very valuable people resource by giving them the most modern equipment and resources available through extensive research and development efforts.

Research And Development Efforts

There's no argument that our wartime mission drives us to

equipment dependency. However, much of this equipment is extremely complex or has little use in peacetime. The potential for reliability and maintainability problems is real. We anticipate that problems with R&D may come to a head when it's too late, as the following quotation from the Falkland War suggests:

> *Both sides improvised solutions to needs and problems. In the process, they showed once again that the peacetime pace of development enjoys a luxury of layers of people who do little besides review and comment on other people's work.*
> ***Editor-In-Chief***
> ***Air Force Magazine***
> ***Military Lessons of the Falkland War***

Technology within the Air Force is often seen as the ultimate solution to our problems. We tend to "hang our hat" on a product about to hit the field. The large, influential research and development community in the Pentagon advocates and perpetuates this mindset. We also assume we will have trained people to field these new systems and the supplies and the mechanics to keep them going. Unfortunately, history has proven this assumption untrue.

There are some very important tenants of research and development that, if kept in mind, can overcome some of these negative trends. The first point is that every attempt must be made to keep it simple. More than likely, the person available to perform a particular mission on a particular piece of equipment will have had little hands-on training with that equipment. It must be made durable, as well, so it can survive rugged wartime environments. A second key to success is to avoid equipment-intensive solutions with specialized equipment. We'll have a much better maintenance and reliability history if we can use in war what we train with from day to day. It will be the senior engineering leadership's task to balance technological solutions with some common sense alternatives. We need to develop some hip-pocket, low-tech equipment to get the job done when all else fails. Finally, we've got to create an environment that will allow our folks to think and encourage them to use what's on the base at the time a requirement comes up. There's absolutely nothing that can replace good old Yankee ingenuity. It's saved us in many wars. In the classic sense, it would be difficult to "teach" our people how to think. What we can do is to train the way we plan to fight.

Figure 11: We've got to train like we're going to fight

Air Force Readiness Training

I am convinced our peactime tasks are not preparing us for war; we've about lost our leadership and contingency thinking because today's priorities are focused on the wrong things. In PACAF, we have the annual joint/combined Team Spirit exercise that many engineers worldwide have participated in. And every year, our tent cities are perfectly aligned in neat rows because it looks good for visiting dignitaries and it can often be tucked away from the base proper. (See Fig 10.) We even have a competition to select the best-looking tent city! But this arrangement is wrong because in "real" war, with a high threat scenario, dispersing those billeting assets is essential to survive.

This is the literal "keep-off-the-grass" mentality and the origin of the theme of this entire article. There are several reasons why this mentality is flourishing. First, a survey of wing, base and civil engineering commanders conducted by an AFIT graduate engineering student indicated they *all* put a higher priority on base appearance than on civil engineering operational readiness inspection results. Sad but true, it's really no surprise that today we are graded on how nice the base looks. That's because training disrupts our daily work schedule and doesn't get projects done. And, of course, it effects productivity because it's inefficient.

We not only can change this restricting mentality; we've got to change it. We must create a wartime mindset in our daily routine that will cement the need for direct correlation between what we're doing today and making us ready for war tomorrow. We've got to be innovative in work planning and execution. And we must provide growing room for our young officers and NCOs by allowing them to plan a job, pick their team, find the equipment, supervise the task and meet a schedule. Finally, we need to drive our level of wartime training toward 100 percent. We may never get there but the relatively low-percentage investment in training conducted today in the engineering force will not prepare us adequately or even come close. Until we can organize and train day to day like we're going to fight (like some other Air Force units), the engineers will remain behind the power curve. (See Fig 11.) I believe Col. Jim Conti, the first commander of the 554th RED HORSE Sq., said it best in a 1965 quotation from Vietnam:

> *We were the product of the Base Civil Engineer philosophy, oriented towards maintenance and repair on a drastically reduced basis. Across the board, less than 20 percent of the personnel assigned could be considered skilled craftsmen. They had little or no practical training.*

I'll leave you to decide if we've moved beyond that point in the last 21 years.

The purpose of this article is to show that there is a "keep-off-the-grass" syndrome which has affected

our Air Force Engineering and Services readiness posture, both in and out of the Pacific. Unfortunately, there are far too many other areas I could have walked you through to support this thesis. Areas such as mortuary affairs, ORI scenarios, air base ground defense and ration support all have evidence that the "keep-off-the-grass" mentality is all too alive and well. My intent is not to point fingers or to air dirty linen, but to stimulate every E&S officer and NCO to think as we seek solutions to our readiness challenges. We've got a big job ahead of us. We'll be plowing up some hard ground — and stomping some tall grass!

Preparing for war in peacetime is not easy. It's likely to be the most demanding challenge of our careers. We haven't done much of that and, as I've shown you from history, our predecessors didn't do much of it either. But, we're beginning to change. We're setting new priorities, defining wartime requirements, focusing on training, creating realism in exercises and integrating Engineering & Services into the flying mission. We're involving the U.S. Army, the Air National Guard, and the Air Force Reserves because we realize we can't go it alone. We're concentrating our research efforts on faster, simpler repair methods.

There's no doubt we'll succeed in these efforts, but it won't be easy. We'll have to step on the grass and upset the routine. We've got to do it because our next war could be won or lost in days, if not less. We simply cannot affort to drop the readiness ball.

If there is only one thing you take from this article, let it be this: *Readiness is not a piece of our businesss; it is our business!*

I challenge you to step on the grass! ★

A SERVICES WAR STORY

YOKOTA AB, JAPAN

Editor's Note: This article is adapted from the *Engineering & Services Bulletin* for the Pacific Air Forces.

by Maj. William M. Carter, Jr.

It was the last fresh eggs they would see for a while. MSgt. Sampson knew that no one would go hungry but the logistic pipeline was still full of parts and fuel for airplanes and vehicles, not people. Actually the fresh supplies on hand in the commissary had lasted almost 2 days longer than he expected.

"Sarge," asked Airman Holly, "did the plane get out last night?" Holly was very tired from the 12-hour shifts at the dining hall but asked the question that was also on Sampson's mind. "Haven't heard yet," was the reply. A1C Carrico, returning from the flight kitchen, heard the question and assured both men "Yes, the '141 was repaired and left about 0310." Their families were flying back to the states, a part of the NEO plan that worked, sort of. Meals for departing families were not one of the things that food service had figured into their ration requirements.

The talk was mostly about the terrorist rocket attack of the day before. We took two rockets, almost comical in that one had hit the incinerator. The other hit the area where some of the tents were being assembled for the extra folks due to arrive tonight. Not so funny in that three Prime BEEF guys were injured, a ton-and-a-half truck turned into a pile of spare parts, and now over 60 newcomers were going to have to find someone on an alternate shift and *hot bed* their sleeping arrangements until more tents arrived.

In the Services Control Center several problems were heading to crisis proportion. The interservice support agreement for laundry, so economical in peacetime, turned out to be unworkable in wartime. The owning organization — the Army — was struggling to keep up with the demand generated by the surge in Army assigned personnel. Neither the Army, who had provided the trucks in peacetime, nor the Air Force were willing to give up such a valuable peace of equipment to clean "funky underwear."

SrA. Coles arrived from the tent erection site to report that not only had the rocket destroyed six tents but shrapnel damage was light to moderate on 10 others. He had tracked the flight of one piece of metal in, through, and out of two tents before it finally stopped, imbedded in the pole of a third. The NCOIC did not want to think about what would happen if the shrapnel had been stopped by a person's body. SrA. Coles had a more immediate problem than a tent-by-tent search and recovery effort.

"How are we gonna fix the holes in the tents?" he asked. The answer was to use the tent repair kits the chief of Services had insisted the squadron buy. Although not in the table of allowances, it was a key piece of field equipment to insure continued tent operations and he had ordered one kit per three tents. SrA. Coles was given the location of the kits and asked if he had any good news.

"Field kitchen is almost done. Should be serving supper, I think." Satisfied nods were exchanged by the squadron commander and MSgt. Sampson.

Ideas on doing the laundry locally were reviewed. Commandeering the BX laundromat only helped a little. A field laundry unit could be ordered — "Do it!" said Major Carter — but it was not expected to be available for 30-60 days. Dorm residents and the folks lucky enough to be anywhere in billeting were ordered to wash their own linen. Using the family housing washers and dryers was out because at this base every apartment or house had its own set. No central laundry rooms anywhere.

On the other hand, putting additive forces into family housing was finally getting underway. Those who got

family quarters could also do their own linen and clothes. The problem might not be too bad after all.

"Reserve a few of those first floor units for doing the organizational things," the commander added as an afterthought. And a small voice in the back of his head said a prayer about no prolonged loss of power. At least he didn't need to worry about detergent right away because the commissary had their full complement in the warehouse and personnel moving into family housing could be counted on to commandeer almost everything of immediate use.

A loud explosion toward the north end of the runway brought all conversation to a halt. A quick call to the Contingency Control Center (CCC) — aircraft crash! Stunned silence followed frenzied phone calls; assemble all the Services 611XOs and the base search and recovery team; put the mortuary on full alert; check in with personal affairs (they heard the crash too — no more info yet); called hospital emergency room (busy the first three times), said they were responding to a C-130 crash; a second call to CCC, more info this time — *augmented crew (eight) plus unknown number of space-A pax, crash is about 100 meters off-base, hit approach light and off-base house; a call for mortuary kits for remains.*

Waiting for the next step is hardest. Mortuary called back plus 30 minutes with half the search and rcovery team assembled plus four Services 611XOs. Hospital called relaying words from Fire chief — some dead, some alive. Cargo is hydrazine, bound for Misawa's F-16s. Consult Ops 355-1 for hydrazine procedures. Have NCOIC call disaster preparedness about masks for the search and recovery team. None to spare. Talk to supply was their answer.

More waiting. Food service called in. Will they need meals at the crash site — call the command post who calls the on-scene commander. Beverages only are requested. Will use shifts and eat at dining hall and field kitchen. Food service can handle the beverages if somebody can deliver. Called CCC — they'll get someone. Another problem from Food Service — there is only enough fuel for the field ranges and immersion heaters to last one more meal. Called CCC — they arranged regular delivery of fuel cans to the field kitchen fuel dump.

Another twist of fate. The off-base house involved in the crash belonged to a local national but he rented it to an American serviceman. A fast check at his duty section. He is supposed to be sleeping at home. Ask Command Post to call on-scene to check house for casualties. Already done. Two remains removed by local nationals. Thank him for update. Call mortuary to check with local officials about at least one of the bodies being American. One hour later, both are confirmed as American — arrangements for their return to U.S. custody completed.

Day Two

All the remains are accounted for — most are identified. A strong afternoon breeze had solved the hydrazine problem. Mortuary asked CE to open the selected gravesite on base but the aerial port said there was room on a C-5 headed for the States. The port guy added that it was probably the last time he can ship remains out. Mortuary and CE met to coordinate starting up of a cemetery.

The field kitchen worked pretty well although it turned out more hot- and cold-water dispensers were needed during a regular meal. Also some customers who had used MREs during exercises were clearly "enjoying" their meals more than those who did not know how to use the water for rehydration. The *mess kit laundry* had been moved to the edge of the street to take advantage of the drains. Rubber gloves up to the elbow were also extremely useful for cleaning pots and pans in the field kitchen. The dining hall and clubs could only provide two pans but disaster preparedness shared some and base supply turned up a case of smalls. Yellow rubber gloves were obtained from the commissary and BX but did not provide as much protection from the hot water and detergent.

The commissary called. Their latest projections showed enough rations for about 10 more days. Ration resupply was scheduled to begin in 15 days. MSgt. Sampson said that food service had figured that would happen. He had already tried to reduce the portion size but the increased activity had actually caused the airmen to eat more, but there was, actually, zero plate waste. The commander was briefed. Services suggested switching to two meals per day across the board to get us through the time lapse. The commander approved but urged us to seek added foods from the local economy. Commissary had been trying that approach since the last ration shipment had arrived. The commissary troop-issue NCO, SSgt. Brown, added that he believed that some MREs were being stolen from the warehouse. The security police had no one to spare for a stake-out but would add the warehouse to their random patrol list. How times can change — in peace you couldn't give MREs away but in war they become desirable target for theft.

Billeting problems were better and worse. Better because more people were in the family housing; worse because keeping track of who was where was still almost as bad as when they were in tents.

Day Three

Another homemade rocket attack at night produced two more obvious lessons. One rocket had knocked out the power distribution lines only two poles from the main plant. Most generators worked but the real shocker was how many personnel had no flashlights and/or batteries. CCC had us open the BX and issue every type flashlight and batteries until the supply was exhausted. The base supply representative at CCC added "batteries" to his growing list of expendables required.

The other lesson was the one feared from 2 days before. The rocket landed in a collection of tents killing four and wounding many, including three cooks. The tent search and recovery effort got priority on the available flashlights but they almost weren't needed. Headlights illuminated the general area easily since the tents were pitched close enough together that when the first one caught fire, all the others downwind were also lost. It was a grim, smoky scene, unholy in sounds and smells as well.

"War is Hell" is a true description. The mortuary and CE agreed to open the cemetery at first light.

All the unissued clean sheets were now earmarked for the hospital and field hospital. The housing units near them held hospital personnel and their washers and dryers ran constantly to keep a clean supply of sheets and surgical gowns on hand. The CE appliance shop was repairing machines as fast as possible but their output was bound to be reduced when it was learned that one of that night's fatalities was from that shop.

The Prime RIBS teams were due in by tomorrow. The local nationals who worked in all the vital support shops — CE, food service, and security police — had reacted in one of two ways. They stayed home, fearful of their lives or came in ready to work,

anywhere, for 12-hour shifts, mad at a world that had lost its peace, but determined that western style government should be the outcome of hostilities. Those who came in outnumbered those who stayed home about by 4 to 1.

The situation at the flight kitchen had stabilized at 14 hours hard work per shift. With NEO gone, only the aircrew or transiting passengers had to be fed. That was small comfort, for the fighting had produced a need to send in far more reinforcements than war plans had anticipated. After much frantic telephoning most of the flights were now coming in with meals overpacked from the CONUS departure base.

The ominous side to all the reinforcements was the mortuary affairs program. Battlefield deaths had saturated the overseas mortuaries within hours of the start of hostilities. The priority of airlift out of country was for the seriously ill and equipment needing repair. Very few bodies were getting home. Most were being buried on the spot with as much attention to positive identification as the situation allowed. The joint mortuary workshop in early 1986 had paid off in terms of faster decisions about burial, standardized procedures between the services, and clarification on the treatment of allied and enemy dead.

Day Four

The Prime RIBS food service people took over the NCO Club dining room full-time now, relieving the MWR staff (some of whom had attended the Prime RIBS school) to run the bar and limited social programs that were starting to re-emerge as folks got used to being at war. The 611XOs were immediately assigned to help the graves registration office control and expand the cemetery, make family notifications (with personal affairs) and secure an ever-increasing amount of personal affects.

Running Services now was a mixture of the jobs you do when you are at peace; and, jobs you only do at war. There was no time to slowly go to war. It happened quick. We did all what was necessary to keep the base going; caring for people — the living, the wounded and the dead; pitching in wherever we could help other base support teams; innovating and coming up with ways to get things done.

The above has not happened. The scenarios depicted could happen. Please forgive the errors. Think about your actions if it were you. ★

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The Bottom Line:

Readiness

by Capt. Steven T. Lofgren

A Prime BEEF deployment is always a major learning experience. I've been lucky enough to participate in two JCS exercises (Distant Drum '83 and Display Determination '84), and would like to share my thoughts with you.

For those who haven't been on a deployment in support of a JCS exercise, its a traumatic experience. A C-141 picks up your 30-50 man Prime BEEF and RIBS team and equipment and drops you off at an airfield in a foreign country. You are shown an open field and told that in 10 days about 20 planes and 400-500 people will arrive. They need a place to sleep, eat, shower, wash clothes, and so on. Your job is to build the facilities for them. Soon a couple more C-141's with Harvest Eagle gear on board drop in and you go to work.

I've drawn three major conclusions from my experiences:

- **Stay in Shape.** You put in some long hours, especially those first few days when you're making a tent city rise up out of the dust. Everything imagineable will go wrong. Personnel problems, material problems, problems with the host country, sickness, injury, and on and on — all will contribute significant levels of stress to your body, which is already exhausted from 18-hour days. Proper physical conditioning will help you survive.
- **There's Only One Rule in War — Win!** Too often in peacetime we all get preoccupied with our own little jobs and the rules that pertain to it. We lose sight of the big picture — the mission of the Air Force — fly and fight. Living in the dirt with the planes tends to get you to focus. The only reason all the people are there with you at that airfield in the middle of nowhere is the exercise. You are there to support those planes. Thus, getting the job done quickly and well, no matter how you accomplish it, is what matters. The end, not the means, is what is crucial.
- **The Role of a Support Officer** — (in my case, civil engineer). It's best illustrated by a story. One night during my second deployment, at about midnight, I was in the refreshment tent worrying about a small rule I had broken in order to get my folks a morale trip to a nearby city. One of the senior Prime RIBS NCO's sat down with me and asked what was wrong (he was in Air National Guard and had been in Vietnam when he was on active duty). As I told him my concern, he began to smile. He explained to me that in the Air Force we have only to remember one small thing — if all the planes go up in the morning, and all the planes come home at night, we've all done our job. I'll never forget that man. As you go about your job, whether you are in Civil Engineering, Services, or any other support field, and you listen to the daily complaints, I suggest you keep that in the back of your mind — *if all the planes go up in the morning, and all the planes come home at night, we've all done our job.* That has to be the bottom line. ★

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PRIME RIBS:
Realistic Practice is the Key

Lt. Col. James P. Bianco

In 1984 the Kirtland Air Force Base (KAFB) Prime RIBS program was rated "unsatisfactory" by the HQ MAC IG team. In 1986 the program was rated "outstanding." The change is the direct result of three factors: realistic practice, adequate RIBS sections manning and good facilities dedicated to "RIBS" operations.

Realistic Practice

The most important element of a RIBS program is realistic practice. At KAFB we are tasked with four PR-4, two PR-5 (services) and one PR-6 (command) teams. Our CONUS sustaining force includes eight civilians, all in billeting, and six military food service workers who are in the "Strategic withhold." Our definition of realistic is "everyone goes" and that's exactly the scenario the IG used to test our program.

Practicing worst-case scenarios or "everyone goes" is not easy. KAFB has two dining halls, 4 miles apart, and services 153 tenant organizations. So when the host wing (MAC) is exercising, tenant organizations, which include the AF Systems Command Academy, Air Force Institute of Technology, Air Force Weapons Labs, HQ Defense Nuclear Agency, etc., don't even know the exercise is taking place. They do expect food service for their enlisted personnel.

In any exercise three options can be used to realistically practice Prime RIBS mobility and still serve the customers.

- **Don't close anything and only deploy a few cooks and billeting clerks.** There is a great deal of emotionalism behind this scenario. Enlisted meal card holders are "entitled" to rations-in-kind and withholding meals is like withholding cash. Food service is the only organization on base that has no "put off" work during an exercise which can be made up the next day. Food service cannot serve a customer two breakfasts the next day. In a nutshell this option doesn't work as the customers are well-served but the mobility exercise is not realistic.
- **Deploy all food service and billeting teams and close one or both dining halls.** A variation of this scenario is to work cooks "half to death" on 12-hour shifts which usually translates into bad food and accidents caused by tired workers. Billeting usually limps along with too few to man the desk. This option gives realistic training but the reputation of the Services organization suffers.
- **Deploy all food service and billeting personnel and use contractor cooks, Reserve or Guard cooks to operate all dining facilities and man the billeting desk.** This is the method we selected at KAFB. The New Mexico ANG (known locally as the "enchilada Air Force") has 16 food service and three billeting personnel assigned. All ANG personnel work with us on weekends during the year and most are able to schedule their 2 weeks annual training to fit wing exercises and the "window" for our IG visits. Although IG visits are unannounced, HQ MAC does publish "windows" so that ANG employees can be given notice of an approximate 2-month period.

When the IG visit was announced, the ANG Services officer was notified. The ANG workers responded, stepped into the vacated positions, operated one dining hall and assisted in the other. Active duty

Planning for Warfare Capability:
THE OSAN AIR BASE EXPERIENCE

by Kenneth L. Reinertson

The ability to successfully employ and sustain combat forces is directly related to the quality of operational support. The fundamental Air Force support system — the airbase — is highly vulnerable due to its fixed location, large size and enormous logistical requirements. It, therefore, jeopardizes effective sortie generation during times of emergency or conflict. Additional pressures on the base support system have resulted from the increased sophistication of modern weapons systems and maintenance equipment. Not only has the machinery become more complex, but the means by which information is processed and material is distributed have outpaced the response capability and capacity of the typical base infrastructure. As summarized in the Force Logistics Research and Studies Program report: "We are at a time in our nation's history when development planning is most important to our Air Force. Rapid advances in technology, coupled with a changing threat, dictate that we assure a planning process capable of reacting to dynamic operational requirements."*

Within Air Force Engineering and Services, that process is termed Base Comprehensive Planning (AFR 86-4, Dec. 26, 1984), better known as the "BCP." Mission support — both in wartime and peacetime — is at the heart of this new program. Unlike traditional base master planning, the BCP establishes a systematic approach to decision making which incorporates requirements at the outset of the planning process.

In the past, base planning relied on concepts of civilian airport design and urban development techniques derived from those of typical American communities. The

help was limited to storeroom and some supervision. Not only did we receive an "outstanding" rating, but our customers suffered no degradation of their entitlements.

Since not every base is blessed with a large on-base ANG wing, other scenarios are suggested. Mess attendant contracts could be modified to include closing during wing exercises and inspections. Besides the Air Force, Navy, Marine, and Army Guards are usually looking for realistic training.

We also include a payoff for the ANG help. ANG food service and billeting personnel participate in all local training field exercises and will soon be attending Prime RIBS classroom training. Active-duty-supported training helps the ANG keep their "C" ratings high as they possess little field equipment.

One may ask, "Where is the realism if the ANG is filling in for active duty? What if both organizations are mobilized at the same time?" In today's political climate it is very unlikely that the 150th TFG (ANG) and the 1606 ABW would be deployed simultaneously. Most scenarios call for only selected units deployed for short periods. If longer periods arise where backup food service or billeting workers cannot be obtained, commanders can then close facilities, grant basic allowances for subsistence and hire additional nonappropriated fund billeting clerks. Exercises are the problem. Real situations elicit the use of different solutions.

Adequate Manning

Our present authorized manning for the RIBS section is one. One person can't handle the job. We assigned two using the old "take-it-out-of-your-hide" method. However, we also give the RIBS section other duties. Typically, the NCOIC of Services handles formal upgrade training (peacetime) and the RIBS section maintains an entirely different set of training records (wartime). We no longer have an NCOIC and all training is handled out of the RIBS section.

Prime RIBS Facility

Unfortunately some of us must operate Prime RIBS out of areas no larger than a closet. The troops cannot identify with the RIBS section and mobility exercises are to be endured. We were fortunate enough to obtain a large, but dark and dingy, area in the basement of an office building. A lot of scrounging in property disposal yards, judicious use of prisoners for labor, imagination on the part of the NCOIC and lots of help from Civil Engineering, produced a first-class facility. The troops now know where the RIBS area is and can identify with the food service/billeting mobility mission. Mobility exercises still aren't fun but no one sits in a cold warehouse, with simulated equipment, wondering "what's going on?"

By combining the above three elements, AF Prime RIBS operations can be improved at little expense. Some scenarios will also benefit Reserve and Guard units which is an additional savings in training dollars. Prime RIBS is not just another duty section — it's the way we go to war.

★

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emphasis was on map production and upkeep. In contrast, the BCP focuses on the base as a single unit, integrating the variety of requirements, procedures and conflicting options which affect air base performance, and translating them into a concise, long-range plan of action. These plans provide essential information and guidance on the available resources (people, facilities, systems and land), operational support status, development alternatives of the base, and establish priorities for our construction programs. Besides serving as a common frame of reference for commanders and staff, the comprehensive plan creates an ongoing process which includes the entire base organizational structure.

Understanding the philosophy behind the program is one thing, but in practice, how does the planning process actually work? Although we now have several examples of completed BCPs, one in-house effort deserving special mention was implemented at Osan Air Base, Republic of Korea. Sponsored by HQ PACAF, this endeavor was initiated by Col. Charles Link, 51st TFW commander, and Col. Peter LoPresti, base civil engineer, in October, 1984.

A Planning Assistance Team (PAT) had visited the base during the previous year, but little progress had been made toward implementing team recommendations. The current wing commander had been the combat support group commander at the time of the PAT visit, and he wanted to see some accomplishments on his second tour at Osan AB.

What followed was an intensive, highly organized team effort that included participants from every base organization and tenant unit. Representatives from nearly every level and rank were involved. Additionally, three members from HQ USAF Engineering and Services were invited to Osan to provide advice (and labor) on land use, transportation, and architectural planning and design.

The formal process began with a briefing to the base facilities board by members of the 51st Civil Engineering Sq. on the overall purpose and objectives of the plan. A milestone chart and work assignment graph were presented, as well as a summary of expected products and participating agencies. The board concurred with the concept and established a working group to carry out plan development.

The next hurdle was to find adequate working space that could be maintained as a central meeting area for the group without interruptions. The vacant half of an airman's dining hall (usually used as an overflow space for the annual Team Spirit exercises) was found to be perfect for this function. Partitions, chairs and tables, drafting equipment and office supplies were brought in from the civil engineering offices. Several temporary telephone

extensions were installed, a particularly smart idea, given the number of incoming and outgoing calls the group generated!

At the opening of the meeting, each member briefed the rest of the group on the mission, personnel, facilities (existing and programmed), and unprogrammed requirements of his or her agency. This provided an introduction and perspective on how base agencies should function together, and what could be done to make them function more effectively. From this meeting a preliminary list of requirements and action items was prepared. Major topic areas were selected from the list, and the group then divided into several teams, each assigned to a topic area, with civil engineering members guiding discussion. The assigned topics were:

- Operational Requirements
- Administrative Functions
- Industrial Functions
- Communications Requirements
- Utilities Support
- Transportation
- Military Family Housing
- Morale, Welfare and Recreation
- Community Center

The teams reviewed and verified present and future needs with using agencies, evaluated DOD Form 1391s, and selected appropriate sites for new facilities. Information was cross-fed among the teams to ensure coordination of all necessary support facilities, such as roads, utilities and communications systems.

Every recommendation was filtered through the operational requirements team to ensure its contribution to war fighting capability, survivability, and consistency with physical security objectives.

As the plan progressed, proposed facilities, road realignments, new airfield pavement, utility improvements, and other development proposals, were drawn on a 1"=200'-scale base map (nicknamed the "Super Development Tab"). Smaller scale color land use and transportation plans were also prepared, with overlays indicating airfield/airspace clearances, explosives quantity-distance safety clear zones, steep slopes, forested areas and high noise zones, as well as general land use surrounding the base. Slides (35 mm) were taken of these plans at the base photo lab for later briefing to the facilities board, HQ PACAF, and Air Staff.

At one point the mayor of a nearby city of Song Tan was invited to the base to discuss a possible land exchange. This would enable the weapons storage unit to be moved to a safer, more operationally supportive and secure location. Additionally, the relocation of the main gate area was discussed, to alleviate traffic congestion in the city and allow a more secure base access.

Major recommendations coming out of the teams' analysis included the addition of alternate aircraft launch and recovery surfaces, redundant taxiways to enhance survivability, consolidation of the transportation complex with the MAC terminal to enhance the function of both facilities, expanded aircraft operations and maintenance areas, and siting of dormitories and military family housing units. A new design for the community center area was developed to free valuable land for other uses and provide a better traffic circulation route.

Finally, the working group was reassembled amidst the collection of plans, crumpled tracing paper, and other assorted debris remaining from the planning sessions in the dining hall, to review team findings and create a master list of projects, recommendations and alternatives. A matrix was prepared for display to the facilities board, showing all proposed facilities listed by funding source and fiscal year. The Super Development Tab was updated for the final time prior to the facilities board outbrief.

The presentation to the board resulted in enthusiastic plan approval. Since board members had been part of the process from the beginning, and had been appraised of significant developments as the plan evolved, there were no surprises. Instead, a general recognition of the excellent effort and support for plan proposals was heard around the board room table. The plan was endorsed by the wing commander, who authorized preparation of programming documents for submittal to HQ PACAF.

At a later time, the civil engineering squadron staged a videotaped briefing on the planning process. The tape provides a historical record of what took place, and is invaluable for periodically updating the facilities board and for training purposes.

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CONCLUSIONS

The Osan Air Base experience is indicative of the growing awareness by commanders of the value of comprehensive planning in support of the mission. While the task may seem formidable, the benefits far outweigh the initial investment in staff time. The synergistic effect of the working group activity provides a significant contribution to the effective operation of the base. The fundamentals of this process are:

- Get organized.
- Know the base and its units.
- Involve the base facilities board.
- Include participation by all base units.
- Meet in one location in a concentrated effort.
- View the entire base as a single system.
- Develop a master list of short- and long-term projects.
- Prepare a short brochure and include photographs of the plans and facility sitings.
- Monitor the plan and update it.
- Periodically brief the facilities board on plan implementation, particularly when a new chairperson arrives.

Although we have focused on a planning program for a combat airbase, warfighting capability applies to all installations, whenever they are research, logistics, training, or combat- oriented, for enhanced readiness must extend across the entire range of Air Force operations. An effective comprehensive planning process integrates the base system with its mission, involves the base community, and is linked to a long-range vision of the future.

**Air Force Coordinating Office for Logistics Research Wright-Patterson AFB, OH 1985), p. ii.*

CESMET tips

Slippery Little Suckers — Job order control continues to be elusive in the Civil Engineering business. Keeping up with all of those little suckers can be a full time job for the best "triple nickel." The "slipperiest" ones are those that go to Logistics management. Somehow, those job orders are never where the job order log says they are. I think the "how it happens" is well known — jobs get completed with rat-holed material (shop stock, residue, borrowed, or bought out of the craftsmens' pockets) and the final word or action never gets taken into Logistics. In other words the job gets done, the job order is turned into Customer Service as complete (or someone verbally notifies Customer Service that the job is complete). The job is signed-off complete in the log. Meanwhile, the material comes into Logistics and no one ever picks up the material. O.K. What's the fix? The real fix is to process all paper work correctly. But, short of the "real fix" there is an audit that will help.

The better operations I've observed perform this audit monthly (the monthly frequency is important). The Logistics warehouse reviews it's files and prepares a list (the list preparation must start in the warehouse, *not* customer service) of all job orders on file and their status — material complete, awaiting material, etc. Then send the list to the Logistics office. They review the list and annotate and resolve any differences including the warehouse and the front office, then forward the list to Customer Service. Customer Service reviews the list and annotates the status reflected in the job order log. Customer service returns the list to Logistics for final resolution.

The final resolution can be any of several actions. It may be as simple as making sure the Logistics office agrees with the warehouse, on moving material to another job order/work order, or back to residue. It also may involve getting back with Customer Service and correcting the job order log. The important thing is to resolve and correct any errors. (HQ AFESC/DET, CMSgt. Scruggs, AUTOVON 970-6138)

Engineering/Design/Contracting — What kind of plan or system do you have in effect to try and obligate not more than one-third of your facility projects by contract after June 30 of each fiscal year? Remember, the Air Force policy is to award/obligate two-thirds of your real property maintenance and family housing facility projects by June 30. You need a system for tracking this area if you are presently not doing so! Furthermore, both design and contracting actions must be geared to assure success of the plan. The plan should consider current availability of funds, actual obligation experience for the past few years, and the *bonafide need* rules. This is all necessary because the Air Force must attack both the perception of and the risk of excessive or wasteful year-end spending. (HQ AFESC/DET, Maj. Foley, AUTOVON 970-6138)

Year-end Review — Below is a summary of the CESMET July 1st briefing to Maj. Gen. George E. Ellis, director of Engineering & Services, HQ USAF:

- Base Engineering & Services have been providing good support to the Air Force mission and they are getting better.
- BCE response to job-order requirements remains a high point; 42 percent are done in less than 2 days of call-in with only 4 percent going over 60 days.
- Making and meeting BCE commitments remains a week point.
  - Only 85 percent of job orders are done within 2, 5 and 30 day commitments.
  - Only 59 percent is achieved on the weekly schedule and 61 percent compliance with IWP.
  - Average BCE promises twice as much in the 5-2X program than he can deliver in the current year.
- The RWP lacks honesty. It's overstated and underdone.
- The BCE design and construction of O&M projects is very strong. They average $12 million in the current year design program; each engineer averages 7 projects with an average value of $1.1 million; the average contract has 2.5 changes with a value of $2,500 per change, representing only 2 percent of the program. (HQ USAF/LEET, Maj. Earls, AUTOVON 297-4264)

AFLC PRIME BEEF REALLY COOKS AT AIR FORCE COMPETITION

by Ken Perrotte

An Air Force Logistics Command Prime BEEF team put it all together in June to bring home the bacon from the Air Force-wide Readiness Challenge '86, June 2-6, at Eglin AFB, Fla.

The 2750th Civil Engineering Sq. 25-member team battled head-to-head with "the rest of the best" from 10 other Air Force commands. They became eligible to compete at Eglin after winning the AFLC contest in May at Robins AFB, Ga.

The competition required teams to build a field operating base under wartime conditions. The different steps used in constructing such a base were broken down into competitive "events" such as maintaining and repairing bomb-damaged runways, erecting aircraft revetment kits, building facilities, operating in a chemical warfare environment and more. Each team was tested for speed and accuracy in performing the events.

Wright-Patterson narrowly defeated the Strategic Air Command team by 30 points, 1,245 to 1,215. According to 2nd Lt. Jeanne Abrams, the team's officer in charge, the Wright-Patt crew went virtually unnoticed during the first couple of days of the competition. "The other teams weren't paying much attention to us. We had been placing consistently in all competitions, finishing second or third in several events. That kept us close. By mid-week, we were tied for first with SAC. We went into the final day of competition with SAC leading by 80 points. Fortunately, it was on Friday that we turned in our best performance of the competition — in the hardback competition. It was enough to put us on top," Lieutenant Abrams said.

Officials at AFLC headquarters said the difference between winning the competition and being a runner-up can be found in the team's approach to the competition, as well as the AFLC philosophy of Prime BEEF readiness training.

First Lt. Joseph A. Rosa, force development officer with the office of the deputy chief of staff for Engineering and Services, AFLC headquarters, said, "We had the rules that would be used at the Air Force contest early in the year. We patterned our command contest after the Air Force-wide event, using the same rules. We also tried to get equipment for our contest at Robins that would match the equipment planned for use at Eglin.

Members of the Wright-Patterson Prime BEEF team build a sandbag revetment around a generator during the "Expedient Methods" event in the "Conventional Protection"category. (U.S. Air Force photo)

"The competition at Robins was designed to be a learning experience for the teams, as well as a selection of the best team in the command," Lieutenant Rosa said. "We wanted our command people to get together, share information and learn from each other — all with the aim of getting the best readiness teams possible."

The AFLC contest was marked by a spirit of comaraderie among all the participants. According to Lieutenant Abrams, it wasn't unusual for the opposition to be on the sidelines cheering you on during the competition. At Readiness Challenge '86, the atmosphere was a little different. The encouragement had to come from your own team.

Lieutenant Abrams explained how her winning team was formed and how they had trained for this competition. "We first went after volunteers from the unit," she said. "Then we looked at others on our rosters and picked the people we thought would work the best. The team had to be made up of a matched-set of people with certain Air Force Specialty Codes. It had to be a regulation PB-3 team with carpenters, refrigeration, heating, equipment operators, an engineering assistant and production control specialist.

"In some areas, such as power production, it was tough finding experienced people. We had only four military people in that shop. Two were experienced and two were newcomers," she explained. "Since they couldn't spare the experienced people, we had to go with the newcomers."

The teams could substitute people in four jobs: supply, entomology, water and waste. "We substituted one heavy equipment operator, one electrician and one engineering assistant. We did have a water and waste person on the team," Lieutenant Abrams said.

With her team formed, the Lieutenant and the team's

Noncommissioned Officer in Charge, SMSgt. Carl Clark, put together a training plan. The 25 individuals forming the teams slowly evolved into a elite group which steadily earned the respect of their co-workers in the 2750th CES.

"We began training for the AFLC contest on Feb. 24th," Lieutenant Abrams said. "We knew right away that conditioning was going to be a key. The competition in Georgia in May would probably feature hot weather and if we made it to Eglin in June, we knew we could expect even more physical demands from the weather. We began in the base gym each morning doing aerobics, lifting weights and playing sports to build team spirit.

"It was funny when we started physical training. The guys laughed when we started the aerobic dance, but everybody was so sore the next day, they soon quit laughing," Lieutenant Abrams said. "After a couple of weeks, we cut our time in the gym but still emphasized physical fitness. The work we would be doing would be hard."

Conditioning under way, the next step was to begin rounding up material and outfitting the team. Each team member received new steel-toed boots and camouflage fatigues, to set them apart from the rest of CE. The team leaders next found areas on Wright-Patterson that would make the best training ground for each event. Soon, afternoons became devoted to actual field training in competition events.

"Everyone tried out for each event and we wanted to see who had strengths in certain areas," Lieutenant Abrams said. "We considered not only who was the strongest in each event, but also had to make sure the team was fairly evenly divided. We couldn't have the same seven or eight people on each event. Consequently, some people were working events that may not necessarily be their best. But that was needed so that our team would perform consistently. Plus, it was a learning experience as individuals learned more about the other tasks a Prime BEEF unit performs."

The team began to take shape.

Lieutenant Abrams said there were still some concerns about how the team would perform in actual competition. Col. Nicholas Scambilis, commander of the 2750th CES, settled that concern. "One day, Colonel Scambilis told us he had put together a team and wanted to challenge us in building a hardback," Lieutenant Abrams said. "We had been taking about 2 hours to build one and were a little worried, but we took their challenge and told them we would build a hardback using competition rules, a team of 10 men and no power tools. We told them they could use power tools and have more than 10 people. We built that hardback in an hour and a half and they finished theirs in about 4 hours. We gained a lot of respect and self-confidence that day," she said.

The team was on their way to perfecting a technique for building hardbacks that would remain their forte throughout both competitions. They continually trained using a system of "pre-fabrication" in the hardback construction. Two to three people would build the floor, another group would build a roof. Once the floor was finished, the team quickly adds the walls and roof and it's done.

Lieutenant Abrams said their technique drew a lot of attention during the head-to-head competition. "It always looked like our team was way behind to the other competitors, but all of a sudden it's 'bing, bing, bing' and we're all put together and everybody is standing there with their jaws on the ground. The team from SAC must have still been hammering a good 10-15 minutes after we were finished at the Eglin competition," she said.

Another area the team studied before the competition was the chemical warfare event. Since it's an area most Air Force people don't get a lot of exposure to, save the yearly orientations and gas mask inspections, the Prime BEEF team wanted a detailed refresher course.

They solicited the help of the 2750th Air Base Wing's Disaster Preparedness office. They received a 1-day seminar on the proper wear of the bulky, sweaty chemical warfare suits.

"Once we learned how to properly get in and out of the suits, we began looking for ways to do it faster," Lieutenant Abrams said.

"We found a few step savers that enabled us to shave seconds off our time. We started pre-snapping the suits in back so we could put on the pants and jacket without worrying about the awkward snapping procedure in the back," she explained. "We also pre-tied the boots and started to pre-assemble the hoods. This entire procedure usually requires two people, but we were able to do it alone. The second

Ken Perrotte is a public affairs specialist, Office of Public Affairs, HQ Air Force Logistics Command, Wright-Patterson AFB, Ohio. He was previously the editor of the *Skywriter*, the base newspaper at Wright-Patterson AFB. Earlier he was chief of media at Vance AFB, Okla. He holds a bachelor of science degree from Regis College, Colorado Springs, Colo. While on active duty with the Air Force, he worked in public affairs at Grissom AFB, the Air Force Academy, Kelly AFB, and Dyess AFB, Tex.

This sign welcomed the Prime BEEF competitors to Readiness Challenge '86 at Eglin AFB, Fla. (U.S. Air Force photo)

person had to merely check the other to make sure everything was on properly.

"The next step was to set up a practice decontamination station. We practiced for a week on this alone, running the team through the training several times. By the time we were finished, we felt we were doing pretty good," the lieutenant said.

Pretty good would be a understatement when looking at the results from the AFLC competition. The Wright-Patterson team's time in the chemical warfare competition was 20 minutes ahead of the nearest competitor, including their penalty minutes, before figuring in the penalty minutes of the opposition. At Eglin, the temperatures climbed into the 90s the day of the nuclear, biological and chemical warfare competition. The stringent training schedule paid off for the 2750th squad during that event.

Lieutenant Abrams said her team trained for consistency. "We approached the competition with the attitude that we didn't need to win every event. We wanted to take consistent seconds at the AFLC competition and a mixture of seconds and thirds at Air Force. We wanted to be strong in every event," she said.

"We practiced long and hard for this competition," said Lieutenant Abrams after the competition. "For 14 weeks prior to the competition, we were living out of each other's pocket. After the 13th week, the guys knew what they had to do. I came to work one day and they told me we were going to work overtime that last week. They were willing to sacrifice whatever it took to win Air Force. They're a great bunch of guys."

CMSgt. Joseph C. Grazioso, the readiness manager in AFLC's DCS Engineering and Services, credited teamwork and a solid support by AFLC commanders in making the command's effort stand out.

"We like to think of ourselves as creating the forerunner to this Prime BEEF competition," the chief said. "The origins of Readiness Challenge '86 can be traced back to an AFLC base civil engineers conference back in 1982. The base civil engineers discussed the merits of a 'Prime BEEF Rodeo' and they concluded such an event would promote excellence by testing and improving readiness skills and crossfeeding ideas and techniques from around the command. Maj. William Mason, who was at that time the command's readiness chief, was tasked to make such a competition a reality."

Hill AFB, Utah, hosted the competition that first year, featuring AFLC and Air Force Reserve teams. The Reservists enthusiastically joined in and offered airlift and Prime RIBS (Readiness in Base Services) support. The 2750th CES was the winner of that first competition as well. The Reservists hosted the second competition at Dobbins AFB, Ga., in 1984. Organizers from Hill AFB, who had helped set up the first competition, helped the Reservists finalize arrangements for this expanded meet. In 1984, teams from Tactical Air Command, and the Air Force Academy were able to join AFLC and the Reserve.

From this expanded field, McClellan AFB, Calif., another AFLC team, took top honors.

Observers from Air Force Engineering and Services Center saw the benefits of the competition, lobbied for Air Force support and were eventually given the green light to have an Air Force-wide competition in 1986. The result was Readiness Challenge '86.

"Our mobility mission within Air Force Logistics Command has really grown in the last few years," Chief Grazioso said. "These readiness competitions are a great way to test ourselves, build *espirit de corps* and get the people out in the field talking and sharing ideas. We're just hoping AFLC can stay up and keep bringing home the bacon." ★

Readiness Challenge '86

AFLC's 2750th ABW, Wright-Patterson AFB, Ohio, was the overall winner of Readiness Challenge '86, the first worldwide Prime BEEF competition. Other winners were:

- **Second** — Strategic Air Command (416th BW, Griffiss AFB, N.Y.)
- **Third** — Air Force Reserves (910th TAG, Youngstown, Ohio).

Winners in specific areas of competition were:

- Vehicle Operations: 50th TFW, Hahn AB, Germany (USAFE)
- Conventional Protection: 416th BW
- Rapid Runway Repair: 823rd TFW, Holloman AFB, N. M. (TAC)
- Minimum Operating Strip Selection: 102nd MAW, McChord AFB, Wash. (MAC)
- Damage Assessment: 3415th TTC, Lowry AFB, Colo. (ATC)
- Force Beddown: 416th BW
- Chemical Warfare: 50th TFW.

Also competing were:

- 174th TFG, Hancock Field, N. Y. (ANG)
- 3245th ABG, Hanscom Field, Mass. (AFSC)
- 1st Space Wing, Peterson AFB, Colo. (AFSPACECOM)
- 343rd TFW, Eielson AFB, Alaska (AAC)

The competition was hosted by Det. 2, Air Force Engineering and Services Center.

An awards ceremony capped 5 days of intense, spirited competition. The event is designed to enhance morale and demonstrate the vital civil engineering skills necessary to turn an empty runway and fields into a fully operational temporary base to support and sustain Air Force wartime and emergency operations.

Competition ran the full spectrum of Prime BEEF engineering abilities. Teams were evaluated not only for speed, but for quality, efficiency, accuracy, safety, and communication in establishing team spirit and continuity.

Teams were competing for the Meredith Trophy, named after Brig. Gen. William T. Meredith (USAF, Ret.), known as the "Father of Prime BEEF."

MEREDITH TROPHY — General Meredith and Maj. Gen. George E. (Jud) Ellis, director, Engineering & Services, HQ USAF, display Meredith Trophy.

tecnotes

EXPANDED USE OF RIGID REFUELING PANTOGRAPH — Rigid, all-metal refueling pantographs are constructed with two to four sections of 4-inch-diameter Schedule 10 stainless steel pipe and specially designed swivel joints which enable a single point fuel nozzle to be coupled between the heights of 1 1/2 feet and no more than 7 feet above ground level. Designed with a counter-balance equalling the nozzle weight, one man can readily make the single point connection to an aircraft or to a fuel tank truck. Wheels and caster bearings allow the extended refueling pantograph to be folded in compact sections for stowing at the edge of taxiways.

Introduced in the early 1980s for use on Air Force wide-body aircraft by USAFE as replacement for the hydrant hose truck (HHT), the rigid refueling pantograph offers a simple and least expensive means of transporting fuel from hydrant outlets in the ramp area to the aircraft. Advantages include low investment cost, high in-service operating reliability, and economy of operation and maintenance.

Its use is to fuel or defuel aircraft and tank trucks. Pantograph dispensing from automatic pressurized fueling systems is covered in AFM 86-2, *Standard Facility Requirements,* and the interim draft edition of AFR 88-15, *Criteria and Standards for Air Force Construction,* dated January, 1986. The Fuels Equipment and Engineering Planning Group met Jan. 16-17, 1986 at Washington. We agreed to use the rigid pantograph extensively as the Air Force refueling device. (HQ USAF/LEEE, Mr. Lee, AUTOVON 297-6239)

DRY CHEMICAL FIRE EXTINGUISHERS — Tecnotes reported earlier that Langely AFB is in the process of replacing its maintenance-intensive water and CO^2 extinguishers with virtually maintenance-free Halon and dry chemical extinguishers. The money normally spent on expensive hydrostatic testing and reservicing of the water and CO^2 extinguishers will be invested in new Halon and dry chemical extinguishers, resulting in substantial savings for the Air Force. In addition to the economical advantages, Halon and dry chemical extiguishers are highly recommended for use around electronic equipment whereas water extinquishers are extremely hazardous in putting out such fires. Halon fire extinguishers, however, are the suggested units recommended for use around computers, both stand-alone, and imbedded, such as in weapons system stations. If your installation is presently using water and CO^2 extinguishers, we recommend you take a close look the advantages to be realized by installing new Halon and dry chemical extinguishers. (1st CSG/DEF, Mr. Jarvis, AUTOVON 574-2807)

PIPELINE REPLACEMENT — IS IT NECESSARY? The Corrosion Analysis Team (CAT) has encountered many situations in which underground utility piping (natural gas, water, liquid fuels, etc) were needlessly programmed for replacement. A 40-year-old natural gas system was condemned because it was "too old," yet a CAT X-ray and visual observation indicated it was like new. In another case, a water line was thought to be "plugged" from corrosion products, yet an X-ray revealed this was not the problem. Stuck valves caused the reduced water flow. A third case involved "corroded steel lines" which, after excavation, turned out to be plastic and in good condition. In every case, judgement of pipe condition was made by indirect means. If you suspect a deteriorated line, don't rely on a single indirect method to confirm your idea. Instead make an excavation and directly check the pipe. Document any leaks on AF Form 1687. Where possible, repair the leaks, and install cathodic protection if appropriate at each repair site. Replacement is justified only when repair becomes uneconomical. You'll save embarassment when pipeline replacement doesn't cure the problem, and you'll expend your scarce O&M funds on solving real problems.*

EXPENSIVE LEAKS! Product-cleanup from a leaking underground storage tank can easily cost $200 per gallon, not to mention the adverse publicity to the Air Force. Cathodic protection (CP) remains a proven, effective means of preventing corrosion leaks on metal underground storage tanks, if the CP is maintained and checked regularly. The solution — ensure CP checks are made as directed in AFM 85-5, *Maintenance and Operation of Cathodic Protection Systems.**

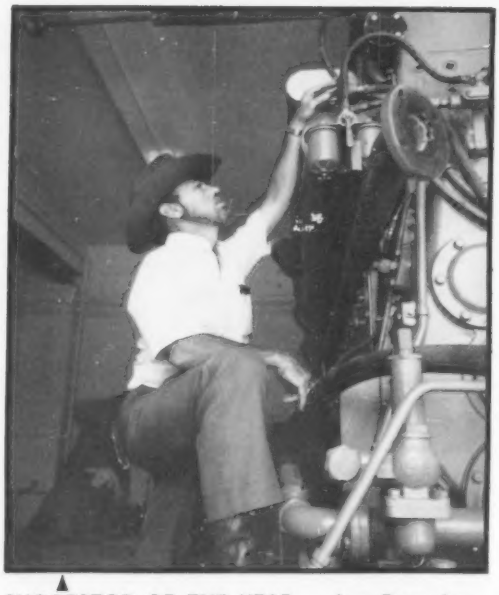
*(HQ AFESC/DEMM, Capt. Rojko, AUTOVON 970-6343)

ESQworld

People, Places & Events of Interest

MIP MASTER — Robert A. Stone, center, deputy assistant Secretary of Defense (Installations) "master of the Model Installation Program," co-hosted the second annual DOD-wide MIP conference held at Panama City Beach, Fla., with Brig. Gen. Roy Goodwin, right, DCS/DE, HQ TAC, and Col. Robert G. Gilbert, left, former commander of HQ AFESC, and now DCS/DE, HQ AFSC. More than 100 MIP attendees explored better ways to promote installation excellence.

SIMULATOR — Tom Hughes, Hughes Associates, Inc., demonstrates a fire fighter situation simulator to Maj. Gen. George E. Ellis, Director, Engineering and Services Requirements Board at Tyndall AFB, Fla. The simulator will provide fire fighters a realistic method of maintaining currency in the station house. ▼



SUGGESTOR OF THE YEAR — Lee Browning, chief of the Civil Engineering Maintenance, Inspection, Repair and Training division, HQ Air Force Engineering & Services Center, Tyndall AFB, Fla., was named Florida's suggestor of the year for two suggestions saving more than $100 million: using Tennessee Valley Authority generators for Clark AB, Philippines, instead of buying new equipment; and changing bare base generators from costly, fuel-intensive turbine equipment to cheaper, more economical and reliable diesels.

GEN. THOMAS D. WHITE AWARD — William M. Kornman, chief of the Natural Resources division, HQ Air Force Engineering & Services Center, Tyndall AFB, Fla., received the award for his contributions to the Air Force natural resources conservation program. Kornman is known for the forestry program, natural resources, and improving communications on natural resources throughout the Department of Defense. ▼

Directorate of Engineering and Services

Current Emphasis

COMPUTER INFORMATION SYSTEMS

WIMS/SIMS Ordering — We have accelerated the ordering of our WIMS and SIMS systems. To date, we have ordered a total of 33 WIMS and nine SIMS systems. Our current plan is to obligate all of our FY 85 and 86 money before Sept. 30.

AMMUS Training — As a result of our meeting on May 28 with AFCAC and Wang Labs, we finalized procedures for ordering contract training (procedures will be published in WIMS Update Letter 86-12). Utilizing the existing training channels, MAJCOMs will identify their WIMS/SIMS training requirements through the Pipeline Management System (PMS). HQ AFESC will control the funding, and Sheppard TTC will consolidate classes and dictate the AMMUS course site, date, and content. Wang has unbundled their commercial training classes and incorporated changes due to the AMMUS operating system. Because of the unbundling, we can customize courses; i.e., schedule composite courses consisting of any individual courses. Wang Labs will teach all courses at each of their six primary training sites (Boston, Bethesda, Atlanta, Chicago, Los Angeles, and San Francisco). AFCAC is investigating the additions of Frankfurt and Honolulu for overseas training sites. In addition, Wang offers some of the classes at their 30 satellite locations. Contract training will be available until July 24, 1987, after which the training will be done at the Sheppard, Lowry, and Chanute TTCs. We are working with Sheppard TTC to extend this date so that the TTCs will have time to install their AMMUS systems and develop their training program.

Lead Base Implementation:

WIMS Lead Base Implementation Schedule as of 12 Jun 86**

MAJCOM	BASE	SITE SURVEY*	HARDWARE IMPL*	SOFTWARE IMPL
TAC	Shaw	24 Feb 86 (C)	14 Jul 86	22 Sep — 3 Oct 86
SAC	Offutt	3 Mar 86 (C)	8 Sep 86	3 Nov — 14 Nov 86
AU	Maxwell	17 Mar 86 (C)	6 Oct 86	1 Dec — 12 Dec 86
MAC	Scott	24 Mar 86 (C)	17 Nov 86	5 Jan — 16 Jan 87
ATC	Keesler	14 Apr 86 (C)	15 Dec 86	2 Feb — 13 Feb 87
AFSC	Eglin	28 Apr 86 (C)	20 Jan 87	2 Mar — 13 Mar 87
PACAF	Yokota	12 May 86 (C)	17 Feb 87	30 Mar — 10 Apr 87
AAC	Eielson	12 May 86 (C)	23 Feb 86	13 Apr — 24 Apr 87
AFSPACECOM	Peterson	2 Jun 86 (C)	27 May 87	8 Jun — 19 Jun 87
USAFE	Bitburg	16 Jun 86 (C)	16 Mar 87	11 May — 22 May 87
AFDW	Bolling	30 Jun 86 (C)	26 May 87	6 Jul — 17 Jul 87
ATC	Shep TTC	28 Jul 86	29 Jun 87	3 Aug — 7 Aug 87
ATC	Chan TTC	11 Aug 86	20 Jul 87	24 Aug — 28 Aug 87

* WIMS *Site Survey* and *Hardware Implementation* —1 week at each location. System should arrive on site 2 weeks prior to hardware implementation;

(C) Complete.

**Projected arrival-on-site (AOS) dates are set approximately 2 weeks before the hardware implementation dates.

SIMS Lead Base Implementation Schedule as of May 28

MAJCOM	BASE	SITE SURVEY**	HARDWARE IMPL**	SOFTWARE IMPL**	
				Food Service	Billeting
TAC	Shaw	24 Feb 86 (C)	25 Aug 86**	18 Sep 86	1 Oct 86
	Davis-Monthan	28 Feb 86 (C)	TAC	TAC	TAC
SAC	Offutt	3 Mar 86 (C)	8 Oct 86	17 Jan 87	1 Feb 87
AU	Maxwell	17 Mar 86 (C)	10 Sep 86***	15 Oct 86	1 Nov 86
AFSC	Eglin	28 Apr 86 (C)	11 May 87	13 Aug 87	1 Sep 87
MAC	Scott	5 May 86 (C)	29 Sep 86***	19 Nov 86	5 Jan 87
PACAF	Yokota	12 May 86 (C)	10 Nov 86	19 Feb 87	1 Mar 87
AAC	Eielson	15 May 86 (C)	1 Dec 86	15 Jul 87	1 Aug 87
ATC	Mather	14 Apr 86	12 Jan 87	14 Mar 87	1 Apr 87
AFSPACECOM	Peterson	3 Jun 86	22 Sep 86**	19 Apr 87	1 May 87**
USAFA	USAFA	5 Jun 86 (C)	14 Feb 87	N/A ****	1 May 87***
USAFE	Bitburg	14 Jun 86	13 Apr 87	19 Jun 87	1 Jul 87
AFDW	Bolling	21 Jun 86	5 Mar 87	16 May 87**	1 Jun 87
ESC	Ft. Meade	23 Jun 86	12 Mar 87	16 May 87***	N/A
AFLC	Wright-Patt	25 Jun 86	8 Jun 87	15 Sep 87	1 Oct 87

**SIMS *Site Survey* — approximately 1 week at each location.

SIMS *Hardware Implementation* — 2 weeks at each location (excluding Peterson, USAFA, Lowry TTC, and Bolling-Ft Meade implementations).

SIMS *Software Implementation* — 3 weeks each for Billeting and Food Service implementations. Administrative software will be implemented with the hardware.

(C) Complete

** SIMS Implementation Team 1

*** SIMS Impelementation Team 2

**** Food Service at USAFA will require additional software development to accommodate the SCAMS system. This function will be implemented upon successful completion of the software.

***** Projected arrival-on-site (AOS) dates are set approximately 2 weeks before the hardware implementation date.

AFM 88-4, Chapter 11, *Criteria for Data Processing Facility Design and Construction,* provides design criteria for facility and environmental systems that support automatic data processing equipment (ADPE) and data processing functions. It applies to all Air Force activities that plan, program, design, and construct such facilities. The final draft has been sent for publication. The distribution of this manual is expected in May '86. (HQ USAF/LEEE, Mr. Abrol, AUTOVON 297-6249)

BASE ENGINEERING

Drafting Aid — Project drawings require high quality, professional workmanship. One man-hour intensive ingredient to quality drawings is lettering. Hand lettering is very time consuming and the level of professionalism achieved depends on the abilities of the draftsmen. A quicker, more standard method of lettering will improve the efficiency of a design section. Computerized machines print black lettering on a transparent tape which is attached directly to the original drawing. The lettering, ranging from 1/8" to 1/2" in height and available in bold, medium or italic script, can be changed within seconds. The machine employs a typewriter-style keyboard and can reduce by 75 percent the time required for lettering using the old Kroy hand machine. The computerized lettering equipment is compact, easy to use, and offers a variety of features which make it extremely versatile. It can be used for drawings, overhead slides, posters and notebooks to list a few applications. The Table of Allowance 445 allows your section one lettering machine. Take advantage of this most worthwhile piece of equipment. (TAC — 1st CSG/DEEE, TSgt. Clearwater, AUTOVON 574-4112)

CAREER CORNER

Relocation Services Contract — One of the biggest impediments to civilian mobility within ESCCMP has been the financial hardships usually associated with the sale and purchase of homes. The Air Force took action Feb. 3 to remedy this problem. An Air Force contract for relocation services was awarded to Homequity, Inc. Services include guaranteed home sale, home finding, home marketing, and spouse employment assistance. ESCCMP members selected for career program positions GS-12 and above are eligible for this entitlement.*

Changes at the ESCCMP Palace Team — Effective Jan. 1, the Office of Civilian Personnel Operations (OCPO) became the Air Force Civilian Personnel Management Center (AFCPMC). Since November, Ray Hatch has replaced Bill Lynch as program manager of ESCCMP, Ruth Spivey replaced Bob Frank as Engineering and Services Career Program administrator, and Barbara Travis replaced Bill Hogan as Engineering and Services Career Program specialist.*

Promotion Evaluation Patterns (PEPs) — Promotion Evaluation Patterns (PEPs) are vitally important to registrants as a career guide. Approximately 300 ESCCMP PEPs should be out in the field at the CCPOs for your viewing on microfiche.*

Mid-level Management Development Program — Many employees participated in the Air Force-wide Civilian Mid-level Management Development Program. Selected from the Engineering and Services community were Gary B. Willems from HQ USAF/LEEHT, for the Industrial College of the Armed Forces (ICAF), and Paul J. Hirsch from HQ USAF/LEEP was selected as a Legislative Fellow.*

ESCCMP Intern Program — Many GS-05 engineering interns have successfully completed their accelerated promotion training and were promoted to the GS-07 level. Our first GS-07 was eligible for promotion to GS-09 in March. More than 10 have been promoted. Management officials say they are satisfied with the program. To ensure that the commitments to the interns are kept, the deputy BCEs and SVs should work closely with MAJCOM representatives to schedule both the MAJCOM rotating assignment and the required formal training at AFIT. FY 86 was an exceptional recruitment year. We have received quotas for 40 in FY 87 recruitment: 27 engineers, three community planners, and 10 from Housing, Services and Realty. A total of 19 of those (18 are engineers) have been hired so far.
*(AFCPMC/DPCME, Ms. Spivey, AUTOVON 487-6388)

QUARTERLY

Distribution — Distribution of the *Quarterly* is functional. This means that organizations having a functional alignment with Engineering & Services may receive the *Quarterly* free by properly completing an AF 764a. The *Quarterly* should be properly distributed within a functional area. It is best to maintain a distribution list to assure that each eligible functional area within E&S activities gets a share of the available publications. The "front-office" approved ratio is 1:1 for BCEs and SVs and their deputies; 1:7 for the offices of divisional or branch supervisors and their staffs; and 1:14 for shops and work centers. Free personal home distribution is not authorized, except as a part of professional "rebluing" for students assigned to the Air Force Institute of Technology civilian institution program. Those wishing to receive the *Quarterly* at home, or to have personal copies, may subscribe individually through the Superintendent of Documents, Government Printing Office, Washington D.C., 20402.*
(HQ AFESC/DEJ, Mr. Sullivan, AUTOVON 970-6467)

POWER

Exterior Power Supply and Distribution — AFM 88-9, Chap. 1, was revised and published in September, superseding the previous edition, dated July 27, 1965. Copies should be available through your base publications office. It is a major rewrite in cooperation with the Corps of Engineers. The Army designation is "TM5-811-1" (same title). Design and construction guidance and criteria are given for main electric supply stations; aerial and underground distribution lines; transformer installations; surge protection; exterior lighting; uninterruptible power supplies; and more.
(HQ USAF/LEEEU, Mr. Conkling, AUTOVON 297-4082/6237)

OPERATIONS AND MAINTENANCE

Acquisition of Self-help Natural Gas — For years, our military installations have routinely purchased natural gas service from "authorized" local distribution companies (LDCs) at rates regulated by state utility commissions. Sole source supplies were generally used. Our only recourse for cost avoidance was reapplication for more favorable tariff rates and intervention before state commissions during public hearings.

These purchasing procedures are no longer applicable for most of our Air Force bases. Competition now exists among natural gas suppliers and transportation arrangements can now be made with most shipping companies as a result of new legislation, changes in regulatory rules, and recent gas market events. These include:

- Legislative deregulation of natural gas.
- Rulings by the Federal Energy Regulatory Commission on pipeline transportation of natural gas.
- Competition in Contracting Act of 1984.
- Change 6 to Air Force Federal Acquisition Regulations Supplement, June 20, 1985, Part 8.3.
- A drop in energy market prices in the early and mid-1980's.

These are compelling reasons why each base should seek competition, for what the industry refers to as "self-help" natural gas.

By competing our acquisition of natural gas, cost reductions of 20 to 50 percent are possible at many Air Force bases. As an example, substantial savings at Tinker AFB, Okla. resulted from the following positive base-level efforts:

- October, 1985, to March, 1986 — Market survey, contracting preparation, and negotiate with LDC for transportation.
- March, 1986 — Published notice in *Commerce Business Daily* and issued request for proposals.
- April 4, 1986 — Received 13 proposals.
- April 28, 1986 — Awarded contract.
- May 1, 1986 — New natural gas began flowing.

Original Tariff Cost for Natural Gas	**$3.568 per million BTU**
New Natural Gas & Transportation Cost	**$2.068 per million BTU**
Cost Avoidance	**$1.500 per million BTU**
Cost Reduction	**42 percent**
Annual Savings	**$3.1 million**

Other such initiatives are currently underway at the Air Force Academy, San Antonio Real Property Maintenance Agency (SARPMA), and other locations covering about 15 Air Force installations.

It is important that bases move quickly in this area of utility contracting. The natural gas market is very volatile. The current gas "bubble" could disappear with time.

If a question exists as to whether or not competition exists in a year or so, a market survey should be made at base level by calling or writing suppliers and pipeline transporters.

Three key questions should be answered during the market survey:

- Is a new source of natural gas available which is sufficiently reliable to meet mission requirements?
- Can transportation arrangements be made to deliver the new natural gas to the burner tip?
- Are economic benefits sufficient to justify the competitive procedures?

When base-initiated investigation indicates a good potential for self-help natural gas, and if additional resources are needed to complete the market surveys and related work, contact your major command utility engineer. For contract assistance in the conduct of market surveys, technical specifications, utility contract negotiation, and a partial list of companies offering self-help natural gas, contact HQ AFESC/DEMB, AUTOVON 970-6452. (HQ AFESC/DEMM, Mr. McDonald, AUTOVON 970-6352)

Certification of Plant Operators — Operators of water and wastewater treatment plants and system have access to the reciprocity register operated by the Association of Boards of Certification of Operating Personnel (ABC), 520 Grand Avenue, Ames, Iowa 50010, (515) 232-3623. Nationally standardized exams for plant operators, and laboratory analysts are now available. Air Force operators are encouraged to take the exams and arrangements have been made with USAF/MPPE, Pentagon, to allow the base education officers on all bases to serve as official proctors for ABC, the sanctioning organization. For application information, write or call the above. Basic information is also available at ALMAJCOM/DEM or DEV. (HQ AFESC/DEMM, Mr. Anderson, AUTOVON 970-6345)

New Award — AFR 900-45 is being changed to include the Maj. Gen. Clifton D. Wright Jr. award for heating, ventilating and air conditioning (HVAC) improvement. It will be presented to the base civil engineering organization which best demonstrates exemplary initiative toward assurance of excellent HVAC systems operations. What will the award look like? It's up to you. Until Sept. 1, HQ AFESC will be accepting suggestions on design of the trophy. The winning designer will receive a special award at the next Worldwide Engineering and Services Conference at Homestead AFB, Fla. TDY expenses will be paid by HQ AFESC. Suggested designs must include a drawing with sufficient detail for trophy construction and should be submitted to HQ AFESC/DEMM, Tyndall AFB, Fla. (HQ AFESC/DEMM, Mr. Wilson, AUTOVON 970-6361)

ENERGY

A New Active Solar Energy Technical Applications Manual has been developed. It provides the Air Force and the architect/engineering (A&E) managers and engineers with information for designing, installing, and maintaining active solar energy systems for Air Force facilities. It was written by the Los Alamos National Laboratory under the direction of the Energy Group at HQ AFESC. The manual is written such that the user can follow the project flow from feasibility through installation, and emphasizes proven design concepts that eliminate "one-of-a-kind" unmaintainable and unreliable systems. The manual will be distributed to the field soon. (HQ AFESC/DEMB, Mr. Santoro, AUTOVON 970-6475)

An Energy Exchange (EN-EX) Program has been established by the Energy Group to facilitate the crossflow of energy information available throughout the Air Force. It will enable personnel, at all levels of energy management, to share and receive energy information that would otherwise not be available or, for the most part, unknown to most. To participate and receive information through EN-EX, simply provide the Energy Group with an energy input (letter, article, etc.). In turn, participants will get all the energy information received by EN-EX. This program is not a substitute for established channels of communication; it's merely a way to enhance them. (HQ AFESC/DEMB, Capt. Armesto, AUTOVON 970-6470)

Facility Energy Policy — 14 draft Air Force Energy Program Policy memoranda (AFEPPMs) were reviewed by MAJCOM representatives attending the 4th annual Facility Energy Working Group (FEWG) during January. Comments are being incorporated, and final AFEPPMs should be published by the third quarter of FY 87. Subjects include energy efficiency goals, energy security, and alternative financing.*

Shared Savings Legislation — Congress has drafted legislation giving federal agencies the authority to enter into 25-year shared savings projects. Department of Energy's Federal Energy Management Program Office expects the legislation to be passed later this year.*
*(HQ AFESC/DEMB, Mr. Beason, AUTOVON 970-6461)

ENVIRONMENT

AFLC Environmental Cleanup — Air Force Logistics Command did $27.5 million of environmental cleanup work in 1985, more than doubling its 1984 level, and leading the Air Force with 40 percent of the $68 million for base engineering cleanup work.

Logistics Command generates a large portion of the Air Force's hazardous waste at its seven industrialized facilities, located in major population areas. The potential impact to the health and well being of the population from past disposal sites is significant.

Under the Installation Restoration Program (IRP) last year, major cleanup work included making remedial action plans specifying cleanup steps, and capping and isolation of abandoned landfills and disposal sites.

McClellan AFB, Calif., required more than $9 million of AFLC's 1985 budget and has projects underway to install caps on a number of disposal sites, investigate contamination in other areas, and to extract and treat contaminated groundwater at one site. Civil engineers at Robins AFB, Ga., initiated a complete closure activity from remedial action plans to isolation and cleanup of a landfill and a contiguous sludge lagoon. This project will cost an estimated $10 million.

Planning for future cleanups is a continuing process which is updated as new data and cleanup methods are developed. About $35 million annually is projected for cleanups in AFLC through fiscal year 1990. (AFLC/DEVW, Mr. Baker, AUTOVON 787-4920)

HOUSING

Under the Model Installation Program, Langley has established a Family Housing Image Improvement Program that focuses on quality service. Civil Engineering has modified its organizational structure to provide housing occupants with a central office to call for all housing-related matters. This office operates a service call function for emergency, urgent and routine work requests, manages housing maintenance personnel to ensure timely repairs, acts as its own quality assurance evaluator, and operates a self-help store. Our customers receive full-service treatment and are not subjected to the frustrations of fragmented service. The control and responsibility to assure customer satisfaction is rightfully assigned to the Housing office. The program has been in operation since November and has improved customer satisfaction significantly. (TAC - 1st CSG/DEH, Mrs. Sytek, AUTOVON 574-5049)

ACQUISITION

A Rapid Runway Repair (RRR) Program Office was established at HQ AFESC by the commander, effective Jan. 1. Its mission is to field the advanced RRR technology developed by the E&S Laboratory and by USAFE and PACAF. The charter is to develop and field a RRR system during 1990 that will be reliable, maintainable, supportable, and affordable. (HQ AFESC/DEY, Col. Sundin, AUTOVON 970-6468)

MILITARY CAREER NOTES

Application Procedures for RED HORSE Duty — Qualified male airmen in AFSCs 54XXX, 55XXX, 56XXX, 611XX and 622XX may now apply for special duty assignment to RED HORSE squadrons. They are the: 554CESHR, Osan AB, Korea; 819CESHR, RAF Wethersfield, U.K.; 823CESHR, Eglin AFB Fla. (Hurlburt Field); and 820CESHR, Lake Mead AIN, Nev., (Nellis AFB). Since the assignment involves frequent and prolonged periods of TDY, the airmen should not have any medical problems that would interfere with deployment.

Airmen must:

- Meet special duty assignment qualifications in AFR 39-11, paragraphs 8-2b(1), *a* through *f*
- Be able to obtain an official passport
- Have a secret security clearance
- Have a current government driver's license
- Have physical stamina to endure periods of prolonged field operations
- Be qualified to be armed and trained according to AFR 125-26, and
- Be in ranks A1C through CMSgt.

The upcoming change to AFR 39-11 will include procedures to apply for RED HORSE duty. In the interim, HQ AFMPC has established means to volunteer. The applicant may submit an AF Form 109 (special duty application), a letter, or any document that states that he is a volunteer and meets the requirements for RED HORSE duty. Documents should be sent to HQ AFMPC/DPMRAD1, Randolph AFB, Texas 78150-6001. (HQ AFMPC/DPMRAD1/SMSgt. Thompson/AUTOVON 487-4008)

RUNWAY LIGHTING

Aviation Lighting Systems — A new generation of visual glidescope indicators (VGI's) employ advanced technology and promise advantages of improved visual characteristics, reliability and reduced cost. Some of these systems are already operational, for the FAA and the Air Force.

For the past 30 years, the Visual Approach Slope Indicator (VASI) glidescope has been the world's primary glidescope indicator, serving as an approach guidance aid for the pilot. Now, second-generation systems have been tested and manufactured, such as the Precision Approach Path Indicator (PAPI), designed to provide sharper and more specific indicators of glide slope position than VASI. It can be visualized as a VASI with the near and far units arranged horizontally on each side of the runway. The PAPI display provides five different combinations of light to the pilot, each representing a specific indication of approach position. The crisper definition of PAPI should allow smaller pitch and power adjustments by the pilot.

Another second-generation approach aid is the Pulse Light Approach Slope Indicator (PLASI). The PLASI is a single-source unit that uses a pulsing light to provide glide path information. Deviation below glide path results in the pilot seeing a pulsing red light; above glide path he sees a pulsing white light. When the correct approach path is flown, the pilot views a steady white light. A relatively inexpensive system, PLASI has been certified by the FAA. (HQ USAF/LEEEU, Mr. Worden, AUTOVON 297-4082)

READINESS

Volunteers Needed for Civic Action Team (CAT) — HQ AFESC/DEO is seeking highly qualified volunteers possessing the grades and AFSCs listed below, for CAT deployment to Moen, Truk Islands, Federated States of Micronesia (FSM), formally the Trust Territories of the Pacific Islands (TTPI).

QUANTITY	GRADE	AFSC	TITLE
1	Capt.	5525	Team Chief
1	CMSgt./SMSgt.	54XXX/55XXX	Team NCOIC
1	MSgt./TSgt.	54270	Electrical Technician
3	MSgt./TSgt.	55171	Construction Equip. Tech.
2	MSgt./TSgt.	55273	Structural Technician
1	MSgt./TSgt.	55275	Plumbing Technician
1	MSgt./TSgt.	55370	Engineering Asst. Tech.
2	MSgt./TSgt.	47271	Special Vehicle and Base Vehicle Equip. Supervisor
1	MSgt./TSgt.	90270	Medical Service Tech. (SEI 496 Mandatory)

Outstanding SSgts. may submit for consideration in the following AFSCs only: 551X1, 552X3, and 472X1. TDY period will range from 240-252 days. All team members will return to their home station upon completion of the TDY. This is a continuing TDY with rotations every 8 months. Members who complete the full TDY period will be awarded a new Overseas Duty Selection Date (ODSD), Short Tour Return Date (STRD), and Date Arrive Station (DAS). (HQ AFESC/DEOP, Maj. Graham or MSgt. Black, AUTOVON 970-6739/40/44)

PLANNING

Disaster Planning — The unpredictable nature of contingencies requires that innovative response procedures be developed for a variety of circumstances. Since civil engineering functions impact more areas of the base than any other single organization, a two-volume draft pamphlet, AFP 93-XX has been developed. Volume I concentrates on actions each unit should take in preparing for the most likely emergencies, while Volume II shifts to expedient and innovative repair methods for rapidly restoring an airbase to its mission. Both volumes are available in limited quantities. (HQ AFESC/DEOP, Mr. Smith, AUTOVON 970-6128)

REAL PROPERTY MANAGEMENT

AFR 87-1, Acquisition of Real Property — On Dec. 27, AF/LEER published a complete rewrite of AFR 87-1, which details how the Air Force acquires real property to support Air Force mission acomplishment. Much new material has been incorporated in the rewrite, such as historical preservation considerations, wetlands preservation, flood hazard analysis, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Intergovernmental and Interagency Coordination for Environmental Planning (IICEP) reporting requirements, Military Construction Codification Act of 1982, etc. (HQ USAF/LEER, Mr. Skidmore, AUTOVON 297-4033)

AFR 87-22, Utilization and Retention of Real Property — was revised and a new regulation published on Dec. 17 establishes Air Force policies and procedures for conducting an annual review of its real property holdings (except industrial real property) to ensure that only the property required to achieve the military mission is retained. The new regulation expands and clarifies policies and procedures, specifically, implementation of Executive Order 12512, issued April 29, as well as restructuring both the outline for utilization and retention of real property and the annual real property study format. (HQ USAF/LEER, Mr. Menke, AUTOVON 297-6233)

TO PhD OR NOT TO..., IS THAT YOUR QUESTION?

by Col. Marshall N. Nay, Jr.

Air Force Engineering and Services has a continuing need for a limited number of commissioned officers educated at the PhD level. The need for this requirement is driven by the Air Force's strong ties to advanced technology. As we look to the future, this need will remain, but will probably grow stronger.

The purpose of this short article is to explain these efforts and to attempt to answer questions young officers often ask relative to career planning. Two of the most commonly asked questions are:

- "Should I pursue a master's degree, and, if the answer is 'yes,' should it be in a technical discipline or in management?"
- "Should I pursue a PhD, and, if I do, how will that affect my Air Force career?"

Let us deal with the master's degree issue. If you are a young officer today (lieutenant or captain), it seems, first of all, that peer pressure is going to encourage you to pursue a master's degree. That by itself is not a satisfactory answer. Certainly, during a typical 20-plus-year career in the Air Force of both today and tomorrow, you will need to complete such studies to be able to perform your duties to the level all of us desire. As for pursuing a specialty area that is technically specific, or management oriented — suit yourself. The Air Force has a validated need for both.

If you look at Table I, you will see the FY 86 advanced academic degree program. There is a fairly even split between management and technically oriented master's degrees. Incidentally, the technical areas change slightly each year based on Air Force needs. In any event, please accept the answer to the first question as a well justified "yes." Whether to pursue a management, technical or composite degree is highly individual based on your preferences, qualifications, and future plans for your career.

The PhD issue is more complex. The Air Force has a validated need for commissioned officers with PhDs in civil engineering and related disciplines, but on a much smaller scale than that for master's degrees. In the past year, a study group noted the following statistics with the PhD issue:

- There were 33 validated positions within Engineering and Services for civil engineering officers with PhDs. These positions are shown on Table II. Most call for officers in the grades of captain and major. The majority are in the education arena with the balance in the Research, Development, Test, and Evaluation (RDT&E) and systems acquisition arenas.
- Only 13 of the 33 positions were filled by PhDs at the time of the study.
- Thirty-one civil engineering officers held PhDs at the time of the study; thirteen were full colonels.

TABLE I
FY 86 ADVANCED DEGREE PROGRAM

The 55XX career field has 44 slots and the 62XX career field has 5 slots in the FY 86 Graduate Engineering Management (GEM) and Civilian Institution (CI) master's degree programs.

Degrees will be offered in the following areas:

• Food Service Mgmt.	5
• Eng. Mgmt. (in residence)	25
• Civil Engineering	4
• Soil and Foundations	2
• Structural Engineering	3
• Sanitary Engineering	1
• Construction Engineering	1
• Architectural Engineering	2
• Industrial Engineering	2
• Electrical Engineering	2
• Mechanical Engineering	2
Total	49

There are six PhD slots for 55XX officers.

• Soil & Foundation Eng.	2
• Structural Engineering	3
• Civil Engineering	1
Total	6

Periodically, there are also validated needs for PhDs in Mechanical, Electrical, and Engineering Management.

Additional information is located in AFR 36-20, Chap. 8.

- There were an additional 16 potential PhD-educated officers available. Ten were PhD candidates in civilian universities under AFIT sponsorship; the other six had finished their university work, were assigned elsewhere, and still writing their dissertations.

Looking to the future, it seems that Air Force Engineering and Services will continue to have a further need for PhD-educated civil engineering officers, and possibly even at an accelerated rate, for the next 5 years. Some thought is being given to validating some additional positions within RDT&E systems acquisition and studies and analysis arenas.

Much effort must be put forth to obtain a PhD today. One can normally anticipate 3 years of study beyond a master's degree. Following successful completion of a PhD, the officer would incur an active duty service commitment of 3 years service for every year of supported study, not to exceed 5 years. The officer would be expected to serve a directed-duty assignment in a PhD-validated position upon program completion.

After that, depending on unique Air Force needs, the officer could expect every other tour to be in a PhD-validated position. In between, the officer could expect base-level assignments overseas and in the CONUS to allow him or her to continue to develop officership skills.

It is not our intent with the PhD program to develop a *corps de intelligensia,* or provide a mechanism that would allow some officers to miss some opportunities in officership that others take for granted. Rather, it is our intent to attempt to strengthen our corporate abilities to effectively contribute to the Air Force's operational doctrine, policy, and systems development decision processes by being able to effectively employ the newest technologies.

In summary, let us all remember that the key to enjoying a successful career, be it in the Air Force or elsewhere, is to do the best in one's present job. This best has many facets. You must put forth some planning effort to achieve a level of balance between base-level and staff assignments; CONUS and overseas assignments, to include accompanied and short tours; on-time PME and formal education; registration if you qualify; and, maintaining currency via continuing education and training. This article addressed only one of these facets — PhD education.

I hope this article answered the questions those of you had. If not, I would be pleased to communicate with you on an individual basis. If you are interested in pursuing a PhD with Air Force sponsorship, please indicate this by submitting a revised AF Form 90. The need is there — as are the rewards.★

TABLE II

PhD POSITIONS

Organization	Number
HQ USAFA/DFCE	9
AFIT	8
SOCE	(6)
SOSAL	(2)
AFWL/NTE	6
HQ AFESC	5
HQ DNA	1
AFOSR	1
HQ AFSC	1
HQ USAFE	2
Total	33

Col. Marshall W. Nay Jr., is the dean of the School of Civil Engineering, Air Force Institute of Technology, Wright-Patterson AFB, Ohio. He previously was base civil engineer for the 48th Tactical Fighter Wing, RAF Lakenheath, United Kingdom. A Civil Engineering graduate of Virginia Polytechnic Institute, he earned his master's in Civil Engineering at Georgia Tech; and his doctorate in Civil Engineering at VPI.

Services Education Moves

by Maj. Joel C. Rutledge (Special Assistant to the Dean for Services)

The AFIT School of Civil Engineering is expanding to provide education to the Services community. Services officer courses currently offered at Lowry Technical Training Center will move to the School of Civil Engineering at Wright-Patterson AFB, Ohio, in fiscal year 1987.

A cadre of Services officers is now assigned to the School of Civil Engineering to develop and instruct these courses. The curriculum will be structured along the lines of existing professional continuing education courses offered to engineers by AFIT. Each course will emphasize leadership and management skills as well as the technical aspects of the Services officer's duties. Flexibility to include guest lecturers from the Engineering and Services community will be preserved.

The five courses are:

- **Services 400** — Base Chief of Services — Designed for chiefs of Services and Services staff officers to broaden their leadership, management skills, and professional attitudes in the effective application of current Services management processes.
- **Services 460** — Services Operations Management — For all Services officers to understand the mission, organization, and operation of the Air Force Services unit and apply current management concepts to accomplish the Services mission.
- **Services 461** — Mortuary Officers — For all primary and alternate mortuary affairs officers to comprehend the mortuary affairs program, to include the guidelines and regulations, and be able to apply this knowledge.
- **Services 465** — Billeting Management — For all Services officers to apply current management concepts in the management of the Billeting branch and to understand its relationship to other organizations.
- **Services 467** — Food Service Management — For all Services officers to comprehend and apply the principles and concepts of leadership, management, and food service operations.

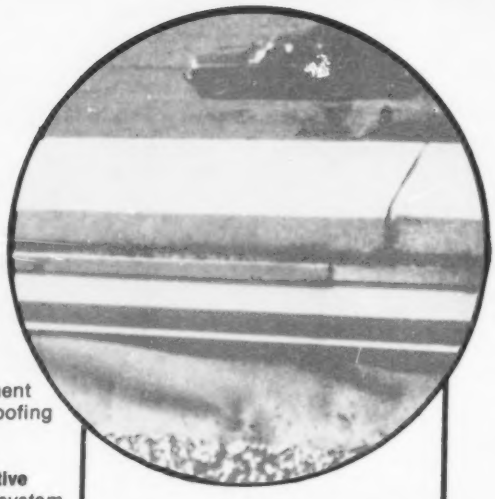
This program provides new opportunities for Services officers and Engineers to interact and develop a stronger Engineering and Services community. The Services instructors at AFIT have begun lecturing to engineering classes. Faculty interaction is underway to broaden the scope of both Engineering and Services curricula. Plans have been made to conduct courses for Engineers and Services officers simultaneously and promote interaction among the students to broaden their education. The engineering courses open to Services officers under Project Crossflow are:

- **Management 003** — Engineering and Services Information Management Systems (ESIMS) Manager — For ESIMS Managers to apply management techniques in administering the ESIMS computer system.
- **Management 400** — Base Civil Engineer — For the Services officer to understand the Base Civil Engineering organization.
- **Management 406** — Family Housing Management Applications — For the Services officer to understand the management of the Military Family Housing branch.
- **Management 425** — Contract Preparation and Management — for Services officers to be able to administer technical provisions of service contracts.
- **Management 438** — Readiness Management — For Services officers to comprehend the systems and procedures for managing standard Engineering and Services readiness activities.
- **Engineering 485** — Contingency Engineering — For Services officers to apply methods for providing mission essential facilities during contingency operations.

Course development is now in progress and the first offering will be the Services Operations Management course in November, 1986. Course descriptions, eligibility requirements, and schedules will be published in the 1987 School of Civil Engineering catalog. Engineering and Services officers who want to attend the courses will need to complete a DD Form 1556, and forward it to their base personnel office.★

Maj. Joel C. Rutledge is the special assistant to the dean, for Services education, at the School of Civil Engineering, Air Force Institute of Technology, Wright-Patterson AFB, Ohio. He recently graduated from Air Command and Staff College, Maxwell AFB, Ala. Before, he commanded the 8th Services Sq., Kunsan AB, Korea. He holds bachelor's and master's degrees in Business Administration and Management from the University of North Carolina and from Michigan State University, respectively.

What you should know... about roofing



by Capt. Suzanne M. Santos

We have roof leaks because we have to use low-slope roofs.

Low-slope roofing, either dead level or nearly flat, is the most common type of roofing we have to manage. This is due to the multitude of large buildings on bases such as warehouses, hangars, and even office space. Pitched roofs on large buildings are often impractical because of unusable heated space, complicated flashings and drainage, difficulty accommodating ceiling-suspended equipment, and complex structure and design. Not only are low-slope roofs our most common roofs, they are also our most problematic in terms of roof leaks and premature failures.

Low-slope roofs must be waterproof. A pitched roof with shingles is not waterproof, but it doesn't have to be. The natural drainage provided by the steeper sloped roof causes the water to run off the roof rather than penetrate it. If we were to put shingles on an almost flat roof, it would leak like a sieve. So the challenge with low-slope roofing is to provide a waterproof roof. The roofing system must provide the proper materials and assembly to accomplish this task.

The Air Force uses built-up roofing on low-slope roofs.

The roofing system the Air Force has chosen to use on low-slope roofs is "built-up roofing" (BUR). Built-up roofing has been the standard low-slope roofing system since the turn of the century. Newer, "non-conventional roofing" systems have appeared on the market during the past 20 years and are currently under experimental application at some Air Force bases. In order to understand why the Air Force chooses to use built-up roofing, it is necessary to have a perspective of the roofing industry's problems during this century. By no means are we in the government the only ones afflicted with roofing problems.

Roofing Industry Perspective

BUR was an excellent roofing system born in the late 1800's.

Built-up roofing came into common use in the late 19th century as a composite of several layers of roofing felts mopped together with hot coal tar pitch. The assembly was covered with a thicker coating of coal tar and sprinkled with gravel. This built-up roofing system proved to be an excellent waterproof membrane. It was first used extensively after the Chicago fire of 1871 because of a need to build many buildings quickly and economically. Built-up roofing turned out to be more economical than the then-standard tile, slate, and copper roofing because it was relatively lightweight. The dead load of built-

IRMAs Worth Watching

by Dennis Firman, HQ AFESC/DEMM

An IRMA consists of extruded polystyrene insulating place over the roof membrane and ballasted with stone, gravel or pavers. This system has been used entensively at the Air Force bases in the Arctic. The system offers the following advantages:

- Membrane serves as a vapor retarder, a needed component of cold region roofs.
- Membrane temperatures only fluctuate 5 to 10 degrees from room temperature.
- The system protects membrane from mechanical damage, such as cuts that frequently occur when snow is shoveled off a roof.

These are the following disadvantages:

- Because the system is loose-laid and ballasted, it weighs more than the conventional systems.
- Initial cost has been prohibitive when compared with the most conventional systems.

The IRMA patent was owned by DOW Chemical Corp. until November. Now that the patent has ended, the system should become cost competitive.

The IRMA is considered a conventional roof system when a hot-applied, built-up roof membrane is used. However, specification of a sheet- or fluid-applied membrane with the IRMA requires MAJCOM coordination and HQ AFESC/DEM approval prior to use.

The U.S. Army Cold Regions Research Engineering Laboratory (CRREL) in Hanover, N.H., has done entensive testing and research on the IRMA system.

The U.S. Army Corps of Engineers is in the process of developing IRMA guide specifications.

We are currently working with CRREL to develop policy statements for the use of IRMA construction on Air Force facilities.

up roofing on the structure was about one-tenth of the commonly used systems, so it saved a lot of unnecessary expense. The passage of time showed built-up roofs were lasting well over 20 years, and in many cases, over 40 years.

Problems developed with larger decks, materials changes, and insulation use.

Built-up roofing seemed to be the ideal roof until changes in construction practices began to surface. Neglect of the overall built-up roof system performance characteristics and basic design principles resulted in roofing problems. When built-up roofing was first used, buildings were relatively small, the construction materials were consistent, and insulation was not used.

Over the years, buildings have become increasingly larger. The amount of structural movement is greater in a larger building and thus greater in the roof deck and membrane. The thermal movement created by heating and cooling during the day and night is greater when the roof expanses are larger. This principle was generally ignored. Also, the larger-sized roofs often have greater structural spans which deflect more, causing water to pond on the roof. This, combined with poor placement of drains, created a bad situation for the roof. For example, on a sunny, winter day there could be a frozen pond of water, which had collected on the roof, yet the black membrane beside it could easily be 50° warmer, causing a thermal shock to the membrane at the edge of the pond.

Changes in material composition also affected the performance of the built-up roof. Coal tar bitumen is not damaged by water. However, in the 1920's and 1930's, the roofing industry began to substitute asphalt in place of the coal tar. Asphalt bitumen looks like coal tar bitumen; however, it has different chemical properties. It is far more susceptible to degradation under water than coal tar. Therefore, ponding water on an asphalt roof brought new problems to the industry. Also, the oil used to manufacture asphalt is procured from different parts of the world, thereby producing a variety of asphalts, affecting application temperatures. Furthermore, the membrane quality became poorer because the felt manufacturers began to substitute wood fibers in place of cotton rag fibers. This change took place when rag became scarce, even though the proliferate synthetic cloth fibers were not appropriate for the felts. As a result, the tensile strength of the membrane was reduced, causing problems.

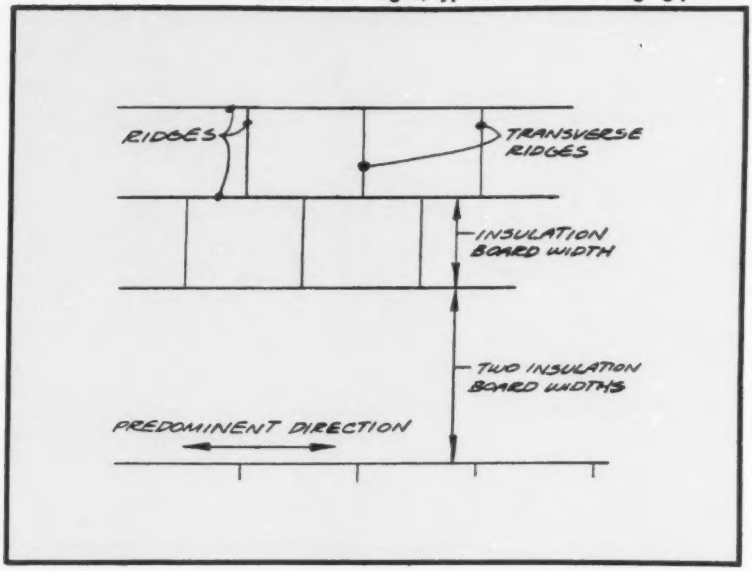
Another significant change in design came about with the advent of energy conservation awareness. In an effort to reduce energy costs, designers attempted to reduce heat flow between the inside and outside of buildings. Insulation was added or increased in the roofing system between the deck and the membrane to achieve an energy-cost savings. The result for the roofing membrane was early failure because the change was not properly accommodated in the design. Since heat was not flowing through the roof, incredible thermal stresses were placed on the membrane. It is not uncommon for roofs to reach 180° F on a hot day. So the problems got worse, and the industry was not helping.

As the changes took place, the roofing industry saw more and more roof failures. During this time, workmanship was also deteriorating because roof contractors were protected by roof bonds. Therefore, the contractors did not have to worry about the performance of the roof. Similarly, the materials manufacturers were not held liable for the products they were producing, so there was little incentive to study the causes of the problems or enforce quality control. The industry was suffering badly in the 1950's, built-up roofing was failing, and opportunists pounced on the opportunities this bad situation presented.

Non-conventional roofing introduced in the early 1960's.

As the roofing industry saw more and more problems with built-up roofing, some decided the blame was entirely on the BUR system. Rather than accommodate the design changes, hold contractors responsible for good workmanship, and hold manufacturers responsible for good materials, the industry decided to explore totally new roofing systems for low-slope roofing. Thus began the era of "single-ply" roof systems. These systems consist of one layer of material. The material may be made from plastics, butyl, neoprene, other rubbers, or any one of numerous synthetic substances. Some common abbreviated terms for these materials are: PIB, NBP, EIP, PVC, CPE, ECP, CSPE, SBR, STR, and EPDM. They are generally classified as elastomers, chlorinated hydrocarbons, and thermoplastic hydrocarbons. In addition, a whole series of "modified bitumens," and sprayed-on polyurethene foam were developed to take the place of built-up roofing. These new, non-conventional systems surfaced in the early 1960's, and most, if not all,

Membrane ridges; typical membrane ridging pattern



of the systems failed at first. Some were abandoned, while others were reformulated to improve their physical, chemical, and performance characteristics. The problems associated with these systems today vary with each manufacturer and material. Included among the problems are high levels of sensitivity to sunlight, difficulty flashing penetrations to prevent water leakage, wind-uplift problems, difficulty making seams and laps stick together, and the list goes on. Taking these problems into consideration, built-up roofing turns out to be an excellent choice because its problems can be prevented, whereas, the new systems have unsolved problems. *BUR improvements make it industry's preferred system.*

The industry survey published in the February, 1985 issue of *Roofing Spec* indicates built-up roofing is the preferred system. The reason is that while others were inventing new systems, improvements were being made in BUR. The problems listed above for the non-conventional systems can be prevented in built-up roofing, and the BUR problems previously mentioned simply needed a little attention to be eliminated. For example, expansion joints were included in roof design to accommodate thermal movements of the larger sized roof and the increased insulation values. Good flashing details were developed to take care of drainage and water leakage and new glass fibers were developed to strengthen the felts. Asphalt application temperatures for different asphalts are now specified by manufacturers. Also, quality control for improved workmanship has become a matter of pride. The National Roofing Contractors Association has an image rebuilding advertising campaign with the slogan: "insist on a professional roofer." Meanwhile, manufacturers have begun to stand behind their products, making themselves legally responsible for the quality of materials they use for a number of years. All these improvements had an impact on the Air Force's decision to continue using built-up roofing.

Air Force Perspective

Roofing policy is contained in AFM 91-36, "Built-up Roof Management Program."

The Air Force began to take a serious look at improving roofing in the early 1970's. A study in SAC at the time showed the Air Force was losing 160 million dollars over the life cycle of roofs because of premature failures. Because the average roof was lasting only 12½ years, the Air Force contracted with Construction Consultants, Inc., to study the roofing problems and to propose a roof management program. The pilot program was conducted in SAC in the late 70's and implemented Air Force-wide in 1980 in AFM 91-36, *"Built-up Roof Management Program."* It is a comprehensive manual for caring for low-slope roofs, including new construction, repair, and maintenance. Policy set forth in this manual was carefully researched and much scrutiny of the roofing industry perspective took place in formulating the published conclusions. Even so, the Air Force Engineering and Services Center (AFESC) continues to gather data and make changes to AFM 91-36 as appropriate.

There is an Air Force moratorium on non-conventional roofing.

The Air Force has approximately 150 buildings covered with non-conventional roofing, including sprayed-on urethane and single plies. These roof applications were approved on the condition that they be watched, and problems and performance would be reported to AFESC. However, the Center has not been receiving most of the reports. Thus, the Air Force has put a hold on all non-conventional roofing approvals until bases begin to submit their data for evaluation. We have to gather data on these systems because the roofing industry does not have records readily available detailing the long-lived performance of these systems. Manufacturers are not normally prone to discussing problems with their systems. Usually, the large failures become known, such as the sprayed-on, polyurethane failures at the Kibbie Dome in Idaho and the Super Dome in New Orleans. However, many of the newer systems have not been around long enough to be monitored properly. Since the Air Force insists on a roof which will last at least 20 years, we have to let the market weed out its poor roofing systems over a period of time, before we can be sure we

Rigid Foam Insulations for BUR

by Dennis Firman, HQ AFESC/DEMM

The National Roofing Contractors Association (NRCA) and the Roof Insulation Committee of the Thermal Insulation Manufacturers Association (RIC/TIMA) have been working together for some time to solve the problems and answer questions concerning the use of polyurethane and polyisocyanurate insulation in BUR assemblies.

According to findings, hot asphalt applied directly to a urethane insulation board can form and create many small blisters on the surface of the bitumen. NRCS-RIC/TIMA have two recommended installation procedures when roofing over these installations over the top surface of the insulation:

- A thin layer of wood fiber board should insulation, perlite board insulation or glass fiber board should be installed, staggering the joints from the layer below. The BUR membrane should then be applied as specified;
- A venting-type base ply should be installed in such a way as to allow venting. The balance of the BUR should then be applied as specified.

NRCA and RIC/TIMA believe that by following one of these recommendations when installing BUR over urethane and isocyanurate, most of the interface blistering problems can be avoided.

Some insulation manufacturers market a urethane or isocyanurate insulation board with a factory-applied fiberglass facer and advertise that a hot applied BUR membrane can be mopped directly to the facer. However, we recommend following the NCRA and RIC/TIMA cover board procedures outlined above until further notice.

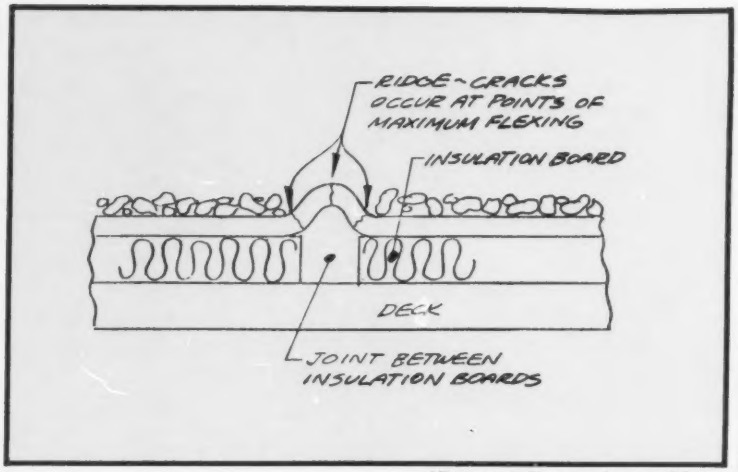
are receiving a good roofing system. Until then, we will continue studying the 150 experimental roofs we have, in order to draw some conclusions.

You should know why the Air Force insists on the policies in AFM 91-36.

The reason for this article is not just because we have roofing problems, but because our decisions are often challenged. Whether sitting in the engineering section, contract management, operations, or the contracting office, you are in a position in which you must defend the decisions derived from AFM 91-36. It may be difficult for a manufacturer to understand why our designers specify certain quality products when others are cheaper. It may be difficult for a contractor to understand why our contract managers insist on such strict quality control compared to their other jobs. It may be difficult for industry consultants to understand why we are hesitant to try new materials and methods.

As an example of the efforts the Air Force has put into researching better systems, in 1983 the Air Force contracted with Oak Ridge National Laboratory to research insulations. The Air Force wanted to know which insulations could be associated with good performance characteristics. Ten industry representatives served on the committee for the study. Unfortunately, however, the resulting study states that because of a lack of industry concensus and a scarcity of documented research data, the Air Force's request could not be satisfied. Instead, the study we received is an economic analysis of insulations with a 10-year data history. Based on the questionable assumption that the materials would perform in a predictable manner for 20 years, the study declared them all suitable for Air Force built-up roofing. Thus, even after seeking out industry experts, we still have to rely on our own evaluation to determine which materials and methods we should use; and yet, industry manufacturers and contractors still challenge our decisions.

You may even be challenged by your subordinates who do not have the time to spend doing the required roof inspections detailed in AFM 91-36, or by your boss who does not see allocating more manhours to preventative maintenance. However, when it begins to rain, and the phone calls on roof leaks come in, our civil engineering work schedule is often disrupted to fix leaking roofs. In most cases, if we were doing proper inspections and preventative maintenance, the problems would never become leaks. The money being spent on O&M roof repairs could be spent on other matters if we could prevent the roof problems in the first place. The means to this end are contained in AFM 91-36. The fault for roofing problems now belongs to us. If we accept bad roofs, we'll have bad roofs. If we don't care, who will?



High severity membrane ridges

The responsibility for Air Force roofing improvements is at all levels.

Responsibility for improving the condition of our roofs falls within a hierarchy of levels. In Chapter 1 of AFM 91-36, instructions for implementing the concepts in the Built-up Roof Management Program are clearly outlined. Methods for implementing them are contained in the remaining five chapters. Through a combination of good training and education and a network of roof managers, the Air Force is making progress towards problem-free roofing.

TRAINING AND EDUCATION:

- Base level
- School of Civil Engineering
- Air Force technical training center

Base level branch chiefs and superintendents are required to conduct training to keep personnel up-to-date with the manual. The School of Civil Engineering (Wright-Patterson AFB) conducts a professional continuing education course on the manual. The Air Force Technical Training Center (Sheppard AFB) conducts a training course on roofing procedures.

PROGRAM MANAGERS:

- Base roof engineer
- Base roof technician
- MAJCOM roof engineer
- AFESC roof engineer

The base-level assigned roof engineer from DEE and roof technician from DEM are responsible for developing and maintaining the roof data base files and roof plans, inspecting and rating roofs, planning and accomplishing in-house repairs, programming contract work, performing economic analyses and deciding treatment alternatives, preparing plans and specifications, and auditing contractor quality control. Table 1-1, AFM 91-36, *Tasks and Responsibilities for the Roof Management Program,* details specific job responsibilities.

Each MAJCOM-designated roof engineer monitors the base-level activity and acts as an intermediary for recommendations to improve the manual, for requests for approval of non-conventional roofing, contract work, and

deviations from the manual. The MAJCOM roof engineer provides advice when procedures are unspecified in the manual, and when implementation problems arise.

Since the Air Force implemented AFM 91-36 in 1980, improvements in roof management have been notable. The areas covered by the manual which have seen improvement include developing the base roofing files; inspecting, rating and prioritizing roof conditions; planning for roofing work, both new construction and repair; doing repairs; and monitoring contract management and quality control. Test roof samples have shown a marked superiority over roof samples from the private sector which were published in the May, 1984 issue of *Roofer* magazine. The Navy and Army have agreed to implement AFM 91-36 on Air Force projects. Although some efforts to implement the manual demonstrate success, others have met with problems. *Problems implementing AFM 91-36 are caused by lack of education.*

The problems we have come across in implementing the roof program relate to a lack of education. For example, while members of the civil engineering community are informed regarding the procedures laid out in AFM 91-36, others in the Air Force community are misinformed. The primary complaint of roof engineers and technicians is obtaining enforcement from the contracting and legal offices on base.

When AFM 91-36 was published, it was scrutinized at the highest levels by procurement and legal representatives. The manual even received an award from the Construction Specification Institute. However, word did not filter down to base-level personnel, so now civil engineering is faced with a degree of opposition from its own members who sometimes allow manufacturers' and contractors' arguments to prevail. This makes the task of insisting on quality products and workmanship very difficult. To solve this problem, base engineers must take it upon themselves to explain the contents, philosophy, and background of AFM 91-36 to other base agencies who must deal with the manual. This may not be an easy job, but in order to have good roofs, we have to work for them. If we are going to keep them, we have to maintain them. Finally, if we are going to save the money spent on roof problems, we have to prevent them. ★

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Capt. Suzanne M. Santos is assigned to the Aeronautical Systems Division, Wright-Patterson AFB, Ohio. She was previously an assistant professor of Architecture at the School of Civil Engineering, Air Force Institute of Technology. She is credited with developing the Built-up Roofing Course (ENG 440). She received the bachelor of Architecture degree from the College of Engineering, Notre Dame University. She completed the Air Force Intern-Architect Development program in conjunction with the National Council of Architectural Registration Boards. She is a member of the Society of American Military Engineers, Tau Sigma Delta.

by Capt. Paul M. Rojko

The Corrosion Analysis Team (CAT) believes that material, equipment, operation, and water (MEOW) are key ingredients in successful water treatment. In preventing scale and corrosion, good water treatment offers several advantages.

- Increased operating efficiencies resulting from clean heat transfer surfaces are possible from your heating and cooling equipment. Scale buildup on heat exchangers caused by untreated water greatly reduces heat transfer efficiency.
- Light (0.012 inch) scale in air conditioning condensors causes higher head pressure and adds approximately 10 percent to your operating costs. Heavy (1.060 inch) scale in heat exchangers can even result in system shutdown due to excessive head pressures.. Taking advantage of these "free" efficiencies can help you meet your energy goals painlessly.
- Your equipment will be much more reliable, last longer, and be more trouble free to maintain. A typical untreated 100-ton air conditioning system common to many Air Force bases will experience three to four times the corrosion rate of a treated system. A tube failure caused by corrosion can cause water to leak into and contaminate the refrigerant and lubricating oil. The acid which results will destroy your equipment.
- A well treated system poses little threat of a catastrophic failure. Boiler explosions can result in loss of life.

In short, good water treatment pays high dividends. How then, do you judge your program?

Materials

First, recognize that you're not treating the water for its own sake. Treatment is to protect your equipment. Consider the example of an Air Force water cooled air conditioning condenser and its related cooling tower. The water picks up heat from the air conditioning condenser, then transfers it to the atmosphere through the cooling tower. Usually, the cooling tower is constructed of mild steel with various other materials such as wood, plastic, or asbestos cement. However, the condenser tubes in many cases are made of a copper alloy. Good water treatment includes one corrosion inhibitor to protect the steel in the cooling tower and piping, and another inibitor to protect the copper in the condenser. While material

THE CAT's MEOW!

consideration is important, equipment must also be reviewed.

Equipment

The steel piping for an "open" cooling tower requires quite different water treatment than that for a "closed" chilled water system. Why — if you are using the same pipe material? The cooling tower is usually open to sunlight and the atmosphere which makes it an ideal breeding place for algae. The algae, if not controlled, will eventually die and slough off, resulting in clogged strainers, piping, etc. Obviously, a closed-loop chilled water system doesn't require algae treatment, as no sunlight is present. The Air Force has a tremendous variety of equipment, including steam boilers, HTHW generators, absorption chillers, solar collectors, and diesel generators. Even with the same equipment, different operation requires different treatment.

Operation

Some Air Force systems operate 24 hours per day, 365 days a year, while others operate only during the cooling/heating season. For example, some cooling towers operate continuously to produce cooling for computer equipment, yet other space cooling systems are shut off for the winter and turned on only for summer use. Cooling towers which run constantly require closer surveillance and consume much more chemical treatment than towers which are properly shut down. Operating parameters, such as cycles of concentration (COC), also depend heavily on your local water quality.

Water

Water at Air Force installations ranges from virtually pure distilled water (very corrosive) to water so hard (very scale forming) that flecks of scale float on it. Water analysis will tell you what in your water you have to fight. Here again, you must tailor your program to your conditions. If scale is a problem, you can soften the water to remove hardness. Alternatively, you can increase the blowdown rate to prevent a scale forming concentration. Much depends on the specific water quality. In short, your water treatment program will purr along when you consider materials, equipment, operation, and water (MEOW)! (A note of thanks to Paul Puckorius for his thoughts in writing this article.)

Capt. Paul N. Rojko is chief of the Air Force's Corrosion Analysis Team, providing corrosion analysis services to installations worldwide. Previously the deputy Base Engineer at RAF Upper Heyford, United Kingdom, he has served in many engineering positions with the Air Force. He is a Mechanical Engineering graduate of Worcester Polytechnic Institute and has a master's in Industrial Engineering from Arizona State University. He completed both Squadron Officers School and Air Command and Staff College. He is a member of the Society of American Military Engineers, the National Association of Corrosion Engineers, and is an engineer in training in Massachusetts.

ADDITIONAL ESTIMATED ANNUAL COST CAUSED BY A SCALED CONDENSER

	Scale Conditions		
A/C Tonnage	Light (0.012")	Moderate (0.036")	Heavy (0.060")
25	$ 250	$ 730	$ 1,100
50	$ 550	$ 1,350	$ 2,200
100	$1,000	$ 2,200	$ 4,500
200	$1,950	$ 5,350	$ 9,100
300	$2,870	$ 8,050	$18,200
500	$4,620	$13,674	$22,750
1,000	$9,076	$27,206	$45,336

Conditions

a. Units operate 12 hours/day, 240 days/year
b. One ton of A/C uses 0.9 KWH
c. Electricity cost 7.0¢ per KWH

HQ AFESC/DEMM, Mr. Myer, AUTOVON 283-6351

REFLECTIONS:
(OR PEARLS PICKED FROM FEDERAL SERVICE TOUCHING FIVE DECADES)

by Bernard C. (Ben) Meredith, Jr.

Everybody should start their career with bright-eyed optimism — "gamble a little" — "go for it." If the thought of job security or retirement is paramount, quit or retire immediately, you're in the wrong business. Find something that excites you, a challenge.

In the '40s, Uncle Sam entrusted young men with life-and-death decisions. I was a 17-year-old sailor in 1944. Thus, my observations really do cover service in 5 decades. Uncle Sam had to do it again in the '50s and again in the '60s and early '70s. We all pray it doesn't happen again under the same circumstances, but there are always battles to be fought and causes to win — an air base survivability program, a readiness budget, an energy reduction, or an anti-terrorist program to invent or to sell. The opportunity to excel, to innovate, to make decisions is just as much with us today as it was in the "olden days" — but remember, ability can be shown only if you can recognize opportunity and act on it.

Registration and membership in professional societies are just means to an end. What we are working for is pride — pride in our country, our organization, our work, our professions, ourselves. This has to start with an attitude — we start out with pride in those things, or at least knowing what we want to have pride in, what we are, and what we are doing. If pride isn't a prime motivator, quit! You don't belong where you are. If pride is part of your outlook, register, join, participate — but let professionalism be a part of everything you do on the job and off. We all — you and I, the organization, the Air Force, the country — benefit or suffer from each other's efforts.

About the role of a civilian in a military organization, we hear such terms as *continuity, training, consultant.* Civilians frequently provide one or more of these services, but more important, they round out the work force. Each person — no matter what suit he wears, or where he lives — owes the same allegiance to his organization and contributes a full measure of his talents and abilities to make the whole team. If for some reason he can't live with the apparent differences in regulations, pay, allowances, duty hours, privileges; or, if they are, or become, irritants, it is all but impossible for a person to function as a professional with pride in his organization. Unfortunately, this fate befalls civilians more often than military. An organization is a team — a group with a common objective. There is no room on the first string for the malcontent or misfit no matter what the reason or the color of his suit.

On bosses, there are good and bad, just as there are good and bad subordinates; but my observation is that the odds are higher that the boss is a more experienced and/or technically capable manager than his subordinates. The selection process takes care of that. Differences between an employee and his boss are usually the result of personal, rather than professional, differences, jealousy over position, differing goals, or plain lack of effective communication. It is a rare individual , boss or employee, who doesn't have some admirable quality. I am convinced that the careerist should observe, cultivate, and use the good qualities of the people around him and refuse to dwell on their shortcomings. I have never had a boss — but I've had a few subordinates — that I couldn't find a basis for

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respect (and those few instances of subordinates, I suspect, were as much my fault as theirs). A singular exception to all of this is where basic honesty is lacking.

Air Force people are public servants — call us protectors of freedom, warriors, or even bureaucrats; but whatever we are called, we must uphold the public trust. Honesty and integrity are essential in everything we do. There is never room to compromise on these qualities in public positions. But even that is not enough; the perception of self-serving actions, even though technically honest, can bring discredit on an individual or an organization. Taxpayers pay our salary and, in effect, are our stockholders. Never forget that we work for them. What we do is totally visible and legitimately questioned by the public. The public deserves the same courtesy and honesty you would give any stockholder in your firm. Their perception of us directly reflects on their attitude and support of the Air Force and the federal government.

You don't know the influence you have on others. Everybody you deal with has some influence on you and you on them. The influence can be good or bad. As I look back, I know that my attitude toward the job and my obligation to my coworkers, my office, my boss, and my organization was shaped by those around me. I was profoundly affected by and owe no small debt to a wise, old civilian engineer, now deceased, who made complicated things simple at Radford Arsenal, and an energetic, young major, now retired, who was a wizard on staff work in Washington. They probably did not know how much they had to do with my career over the next 30 years or so. I cannot begin to name the literally thousands of professional contacts I've had over the years — but we each took something away from the encounter. I can only hope that I was able to give as much as I received over the years. Be aware that thoughts and attitudes are contagious.

In spite of the way we naturally infect each other over time, first impressions and communications are crucial. You have only one chance to make a good first impression. If that first impression is good, you have a head start in selling yourself, your idea, or your organization. If bad, it becomes an uphill battle to become creditable in the mind of the other party or group. It is all part of the communication process. Communications are the lifeblood of our business. Consider the audience; practice — the best idea in the world dies if it cannot be expressed and understood by a second person. Even mediocre ideas have a chance and can become good ones if properly packaged and communicated.

I look back on my federal service with both pride and humility — pride in the opportunities I have had to participate in important programs with super people, and humility toward those same super people who have had faith in me and entrusted me with responsibilities over the years, while learning some of the lessons I have expressed here. If I have a regret, it is only that I was not able to do more for my Air Force, my country, and my God during this career. My next career — whatever it may be — will be based on the same principles. Many of my principles came from the Air Force and I leave them there — in the good hands of the professionals, the men and women of Air Force Engineering and Services around the world.

BEN MEREDITH RETIRES

Bernard C. (Ben) Meredith Jr., technical director, HQ Air Force Engineering & Services Center, Tyndall AFB, Fla., retired March 31 after more than 35 years of federal service.

During his career he earned the Air Force Exceptional and Meritorious Civilian Service Awards. He was a member of the Senior Executive Service.

He began his federal service in the U.S. Navy as an enlisted man in World War II. After the war, he graduated from Virginia Polytechnic Institute with a degree in Civil Engineering. He worked for the U.S. Army Ordnance Corps at Radford Arsenal, Va., before going to work with the Air Force in the Pentagon.

Before Tyndall, he was assistant to the E&S deputy director in Washington. The deputy director became the Center commander, and both positions moved to Tyndall AFB.

In Washington, he worked on many Air Force construction programs including the Ballistic Missile Early Warning System, the Distant Early Warning Line, the White Alice Communications Network, the Titan I and II and Atlas Intercontinental Ballistic Missile (ICBM) sytems. He also was involved in getting the access road system installed for the Minutemen ICBM sites.

Working with prime contractors, such as the RCA Corp., construction of the missile warning system proceeded so fast "the bureaucrats couldn't keep up with us," said Meredith.

The Vietnam War brought needed facility beddowns in Southeast Asia and elsewhere in the Pacific. The Tet offensive caused extensive hardening of facilities after enemy rocket, mortar, and sapper attacks inflicted many casualties and much damage to faciltities, aircraft, and equipment. Air Force and North Atlantic Treaty Organization planners recognized similar vulnerabilities in the European Theater. After an intensive review of airbase defensibility,new requirements came for the tactical air forces, including hardened shelters, the ability to repair bombed runways, and ways to provide alternate operating strips — still major concerns at HQ AFESC.

Meredith, in moving to the Center, brought with him the experience of having advocated the airbase hardening effort before the Congress and the Air Staff.

Senior Master Sergeant Selectees

Electrical Supts. (54299)

Anders, Larry
Ballard, James M.
Billingsley, James
Bishop, Edward D.
Bolen, Donald L.
Burdeshaw, Larry N.
Goss, Robert M.
Greeson, Elmer E.
Henckey, William R.
Hess, Albert C.
Houtchen, William E.
Kammer, Michale F.
Mabry, Boyce H. Jr.
McKean, Larry T.
Morris, Dellard W. J.
Mullinax, Anthony D.
Price, Jerry A.
Punnett, Nicholas C.
Soper, Ernest R.
Sumrall, Harry L.
Tanner, David A.
Truelove, Michael A.
Washington, Robert
Williams, Jack
White, Robert F.
Young, William C.
Zeigler, Wayne D.

Mechanical Supts. (54599)

Aubim, Bruce E.
Benson, Wayne M.
Berger, James H.
Black, Charles A.
Cassidy, Patrick A.
Houston, Richard F.
Howard, Thomas T.
Huggins, James C.
Jenkins, Max A.
Lanore, David F.
Langhorne, Ronald J.
Perry, Allen R.
Ray, David A.
Stevenson, Ken D.
Vanryn, Raymond
Wilson, Woodrow Jr.
Woolever, Ray D.

Pavements and Equipments Supt. (55199)

Anderson, Robert G.
Archer, Charles K. J.
Barnes, Don E.
Chesterfield, Leroy
Deluna, Thomas
Gran, David V.
Hammaker, Neil G.
Housepian, John J.
Jacobs, Jerry E.
Larry, Johnnie
Perry, Charles A.
Price, Howard S.
McClure, Darrell D.
Queen, Basil E.
Rios, Alfredo
Scott, Wallace E.

Structural Supt. (55299)

Allen, George D.
Berd, Ronald L.
Blackburn, James E.
Burke, Michael D.
Cliffe, William R. J.
Day, Harvey
Duffield, Gregory M.
Fleck, Hugh R.
Harrison, Monroe
Highsmith, James D.
Johnson, Arthur L.
Johnson, William Jr.
Ket, Steven N.
Lee, Edgar R.
Ramos, Daniel
Rice, Amberene Jr.
Smith, Theopplis L.
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